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PROCEEDINGS

OF THE

Twenty-First Annual Meeting

OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

HELD AT

BUFFALO, NEW YORK

January Twenty-Seventh, Twenty-Eighth and Twenty-Ninth, Nineteen Hundred and Fourteen

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Published by
American Institute of Dental Teachers

NEXT MEETING, ANN ARBOR, MICHIGAN
JANUARY 26, 27 and 28 - - 1915

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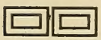

Published by

American Institute of Dental Teachers

JOHN F. BIDDLE, Secretary - Treasurer

517 Arch Street, N. S. - Pittsburgh, Pa.

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LIST OF OFFICERS OF THE AMERICAN INSTITUTE OF DENTAL TEACHERS,

FORMERLY INSTITUTE OF DENTAL PEDAGOGICS

From Date of Organization **Organized at Chicago, August 18th, 1893**

TEMPORARY CHAIRMAN—H. A. Smith, Cincinnati TEMPORARY SECRETARY—J. A. Dale

Annual Meeting	Year	Place.	President.	Vice-President.	Secretary-Treasurer.
1	1893	Chicago, Ill	D. M. Cattell, Chicago		J. A. Dale
2	1894	Old Point Comfort, Va.	D. M. Cattell, Chicago	T. E. Weeks, Minneapolis	J. F. Stephan, Cleveland
3	1895	Asbury Park, N. J.	T. E. Weeks, Minneapolis	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
4	1896	Saratoga, N. Y.	H. W. Morgan, Nashville	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
5	1897	Chicago, Ill	G. V. Black, Chicago	N. S. Hoff, Ann Arbor	D. M. Cattell, Chicago
6	1898	Cincinnati, O	N. S. Hoff, Ann Arbor	H. P. Carlton, California	H. J. Goslee, Chicago
7	1899	Philadelphia, Pa	H. P. Carlton, California	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago
8	1900	Nashville, Tenn	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago	H. B. Tileston, Louisville
9	1901	Pittsburgh, Pa	H. J. Goslee, Chicago	J. D. Patterson, Kansas City	H. B. Tileston, Louisville
10	1902	Chicago, Ill	J. D. Patterson, Kansas City	H. B. Tileston, Louisville	W. E. Willmott, Toronto
11	1903	Buffalo, N. Y	H. B. Tileston, Louisville	H. W. Whitslar, Cleveland	W. E. Willmott, Toronto
12	1904	Louisville, Ky	S. H. Guilford, Philadelphia	D. R. Stubblefield, Nashville	W. E. Willmott, Toronto
13	1905	New York City	D. R. Stubblefield, Nashville	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto
14	1906	Chicago, Ill	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto	B. E. Lischer, St. Louis
15	1907	New Orleans, La	W. E. Willmott, Toronto	Ellison Hillyer, Brooklyn	B. E. Lischer, St. Louis
16	1908	St. Louis, Mo	Ellison Hillyer, Brooklyn	John Q. Bryam, Indianapolis	B. E. Lischer, St. Louis
17	1909	Toronto, Canada	John Q. Bryam, Indianapolis	D. M. Gallie, Chicago	Fred W. Gethro, Chicago
18	1910	Washington, D. C	D. M. Gallie, Chicago	H. E. Friesell, Pittsburgh	Fred W. Gethro, Chicago
19	1912	Chicago, Ill	H. E. Friesell, Pittsburgh	D. H. Squire, Buffalo	Fred W. Gethro, Chicago
20	1913	Pittsburgh, Pa	D. H. Squire, Buffalo	Fred W. Gethro, Chicago	John F. Biddle, Pittsburgh
21	1914	Buffalo, N. Y	Fred W. Gethro, Chicago	H. M. Semans, Columbus	John F. Biddle, Pittsburgh

Twenty-first Annual Meeting

OF THE

American Institute of Dental Teachers

MINUTES.

The twenty-first annual meeting of the Institute of Dental Pedagogics convened at the Hotel Iroquois, Buffalo, N. Y., Tuesday morning, January 27th, 1914.

The meeting was called to order by President D. H. Squire at 10:30 o'clock.

Mr. John Sayles, Secretary to the Mayor of Buffalo, gave an address of welcome, response being made by Vice-President Fred W. Gethro, Chicago.

Calling Vice-President Gethro to preside, the President then read his address (see page 15), which was discussed by Drs. S. H. Guilford, H. J. Burkhart, W. Clyde Davis, C. R. E. Koch, and H. E. Friesell, Dr. Squire closing the discussion. The President then resumed the chair.

The Secretary-Treasurer presented his report, as follows:

SECRETARY-TREASURER'S REPORT.

The proceedings of the twenty-first annual meeting which convened at the Hotel Schenley, Pittsburgh, Pa., January 28th, 29th, 30th, 1913, were not received at the Secretary's office for distribution until December 12th, hence were unusually late in reaching members. This delay was due to the fact that the papers of that meeting appeared in The Dental Brief (to which magazine the society is indebted for the publication of the proceedings) before their appearance in book form. Copies of same were mailed to each member in attendance at last year's meeting, also to each college of the Institute.

During the year the Secretary has endeavored to compile a brief history of the Institute, together with photographs of our successive Presidents and a brief sketch of the life of each. This history has been filed in a loose leaf binder, the intention being to add to it from year to year.

Our membership now numbers forty-six colleges—one college not previously reported having resigned before last year's meeting, two colleges having been absorbed by other schools, and a fourth retiring from business. However, although, there is this slight decrease in membership, there is apparently no diminution of strength, nor in keeping up the interest of members in our organization. Thus we are gaining steadily in scope and efficiency, our opportunities for receiving help, both collectively and individually, being greater than at any time in our history.

Colleges, members 1913	46
Colleges in arrears 1913	1

Financial Statement.

Carried forward	$409.50	
Dues collected 1913	380.00	
Dues collected 1914	560.00	
		$1,349.50
Expenditures as per ledger	$623.52	
Balance in bank	725.98	
		$1,349.50

Respectfully submitted,

J. F. BIDDLE,

January 27, 1914. Secretary-Treasurer.

Dr. H. E. Friesell moved that the Secretary's report be accepted and that the Treasurer's report be referred to the Executive Board for auditing. Motion seconded. Carried.

Dr. B. Holly Smith moved that, in the spirit of the address read by the President, the privileges of the floor be extended to any members of State Boards of Dental Examiners who may be present. Motion seconded. Carried.

Dr. Henry W. Morgan moved that the privileges of the floor also be extended to the dental profession of Buffalo. Motion seconded and carried.

Dr. H. E. Friesell called attention to the fact that a number of visitors from various points in North and South America were present, and moved that they be tendered the courtesies of the Institute. Motion seconded. Carried.

The meeting adjourned to 2 p. m.

Tuesday Afternoon.

The meeting was called to order by the President at 2 o'clock.

The Secretary read the minutes of the morning session, which were approved.

Papers were read as follows:

"The Problem of Teaching Orthodontia in Dental School," by Dr. C. A. Hawley, Washington (see page 33). The paper was discussed by Drs. Abram Hoffman, S. H. Guilford, Harry E. Kelsey, J. R. Morison, R. Ottolengui, Thomas L. Gilmer, and J. G. Lane, Dr. Hawley closing the discussion.

"The Teaching of Clinical Dental Pathology," by Dr. A. E. Webster, Toronto (see page 57). The paper was discussed by Drs. A. D. Black, C. J. Grieves, H. E. Friesell, L. M. Waugh, A. G. Friedrichs, A. W. Thornton, Alfred R. Starr, G. F.

Roberts, and H. T. Smith, the essayist closing the discussion.

Dr. Shirley W. Bowles reported that the Executive Board had audited the Treasurer's accounts and found them correct.

The meeting adjourned to 8 p. m.

Tuesday Evening.

The meeting was called to order by the President at 8 o'clock.

The Secretary read the minutes of the afternoon session, which were approved.

Dr. J. Leon Williams, London, England, presented a paper entitled "A New Classification of Natural and Artificial Teeth" (based on recent investigations and discoveries).

*It was moved by Dr. Ellison Hillyer that a vote of thanks be extended to Dr. Williams for the presentation of this subject; also, that the paper be published in pamphlet form at as early a date as possible and one copy sent to each college for consideration of the faculty; and, further, that a committee be appointed to properly consider during the coming year the work covered by this paper, such committee to present its report at the next meeting of the Institute. Motion seconded and carried.

Paper entitled "Principles of Teaching Oral Surgery," by Dr. Chalmers J. Lyons, Ann Arbor, Mich. (see page 78), was read, and discussed by Drs. Thomas L. Gilmer and F. B. Moorehead, Dr. Lyons closing the discussion.

The meeting adjourned to 9 a. m. Thursday, January 29th.

Thursday Morning.

The meeting was called to order by President Squire at 9 o'clock.

The Secretary read the minutes of the preceding session, which were approved.

Report of Commission on Text-Books was presented by Dr. Ellison Hillyer (see page 93). Upon motion, carried, the report was accepted and ordered placed on file.

Paper entitled "The Teaching of Methods of Diagnosis," by Dr. J. S. Graham, Toronto (see page 97), was then read,

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*Dr. Williams' paper, beautifully illustrated, has appeared in the February, March and April numbers of The Dental Digest. As it is impossible to reprint as fully in our proceedings the members are referred to said numbers of the above mentioned magazine.

and discussed by Drs. K. C. Brashear, Eli H. Long, A. W. Thornton, A. G. Friedrichs, J. B. Willmott, and W. H. O. McGehee, the discussion being closed by Dr. Graham.

Report of the Dental Index Bureau was presented by its Secretary, Dr. J. O. McCall, Buffalo (see page 121). The report was accepted, and discussed by Dr. A. D. Black.

The meeting adjourned to 3 p. m.

THURSDAY AFTERNOON.

The meeting was called to order by the President at 3 o'clock.

The minutes of the morning session were read by the Secretary, and approved.

The following resolutions on the death of Dr. G. W. Cook were drafted by Dr. Ellison Hillyer, and adopted by the Executive Board:

RESOLUTIONS UPON THE DEATH OF DR. GEORGE W. COOK.

Once more the Grim Reaper has entered our midst and, with saddened hearts and heads bowed in submission to the Divine will, we record the loss of one of our comrades, George W. Cook, who passed away in Chicago, January 21st, 1914.

To those of us who came in contact, from time to time, with the genial personality of Dr. Cook, his loss will be keenly felt. His kindly nature made him a man much beloved by all who knew him. Added to this, his scientific attainments and his qualities as a teacher made him a man peculiarly fitted for the work he did so well. In view of the loss which this society feels, be it

Resolved, That in the death of Dr. George W. Cook the American Institute of Dental Teachers has sustained a great loss, and its members feel the absence of a warm friend; be it

Resolved, That this expression of our tribute to Dr. Cook's memory be recorded in full upon the minutes of our society, and that a copy of these resolutions be sent to the family of Dr. Cook.

Report of Commission on Prosthetic Technics was presented by Dr. W. E. Willmott, Toronto (see page 126). Discussion followed by Drs. W. H. O. McGehee, S. H. Guilford, Abram Hoffman, H. T. Smith, and Ellison Hillyer, the discussion being closed by Dr. Willmott.

Upon motion, carried, the report was accepted and the Commission continued for another year.

The proposed amendment to Article I, Section 1, of the Constitution, changing the name of this association from "Institute of Dental Pedagogics" to "National Institute of Dental Teachers," was then taken up for consideration.

Dr. A. D. Black moved the adoption of the amendment to the Constitution as proposed, Dr. W. E. Willmott seconding the motion.

Dr. W. Clyde Davis moved an amendment to the motion as made, that the word "National" be stricken out, and that in its place be inserted the word "American." The motion to amend was seconded by Dr. A. G. Friedrichs. Carried upon call of the roll.

The motion as amended was then carried upon call of the roll. Whereupon the President declared the name of this organization to be "American Institute of Dental Teachers."

Report of the Commission on Nomenclature was presented by Dr. S. H. Guilford, Philadelphia (see page 139). Upon motion, carried, the report was accepted and ordered placed on file, and the Commission continued.

Report of the Commission on Operative Technics was read by Dr. E. D. Coolidge, Chicago (see page 142), which was discussed by Drs. Fred W. Gethro, D. M. Cattell, H. M. Semans, and W. Clyde Davis, Dr. Coolidge closing the discussion.

The report of the Master of Exhibits was read by title, accepted, and ordered published (see page 158).

Dr. Shirley W. Bowles moved that the Secretary of this organization continue in the future to carry on the work of securing a picture of each President with a sketch of his life, to be added to those already in possession of the Institute. Motion seconded and carried.

Dr. Bowles reported on behalf of the Executive Board that the next meeting of the Institute would be at Ann Arbor, Mich.

Dr. Ellison Hillyer: It happens that a certain part of the work connected with the coming Congress in San Francisco devolves upon me, and in the correspondence received regarding this work has come an invitation, asking that this Institute consider the matter of meeting in San Francisco at the time of the Congress. I do not suppose that it would be wise to postpone the meeting of 1915 until September, but we might at least consider this invitation. They ask us, also, to bring a technic exhibit. If we could have in such an exhibit the technic work of **all** the colleges, in such shape as to show it in proper form throughout, I would be in favor of complying with this request; but if the exhibit were to be only a partial one, I would not favor it, for a partial exhibit would mean nothing to the general public.

I think it wise to place the matter before the Executive Board in order that they may take the matter under advisement.

Dr. Gethro stated that Dr. Truman W. Brophy had requested him to announce that the Miller Memorial Fund is in need of $500 more to complete it.

Dr. W. Clyde Davis suggested that the President appoint additional commissions of three members each to represent the major subjects in the curriculum, these to work for the improvement of the respective departments in the dental schools. The suggestion was received and referred to the Executive Board.

Upon motion of Dr. H. T. Smith, duly seconded, a vote of thanks was unanimously extended to the University of Buffalo, Dental Department, and to the ladies of the faculty, for the very bountiful entertainment furnished, to the Chamber of Commerce, and to the members of the Buffalo Dental Society. Motion seconded. Carried.

It was moved that the Secretary be directed to send a message of thanks to The Dental Brief for printing the proceedings of the last meeting without cost to the Institute, and also to the S. S. White Dental Manufacturing Company for furnishing the programs of the meeting. Motion seconded. Carried. It was so ordered.

Upon motion of Dr. Shirley W. Bowles, duly seconded, a vote of thanks was extended to the management of Hotel Iroquois for the many courtesies received.

Election of officers for the ensuing year then took place, resulting as follows:

President, Fred W. Gethro, Chicago.

Vice-President, H. M. Semans, Columbus.

Secretary-Treasurer, John F. Biddle, Pittsburgh.

Dr. Russell W. Bunting, Ann Arbor, Mich., was elected member of the Executive Board to fill the place made vacant by the expiration of term of office of Dr. H. M. Semans, the membership of the Board standing as follows:

Shirley W. Bowles, Washington, one year;

A. W. Thornton, Montreal, two years;

Russell W. Bunting, Ann Arbor, three years.

The retiring President, in surrendering the gavel to President Gethro, said:

"President Gethro, I think I voice the sentiment of the Institute when I say that no one deserves this high honor more than you deserve it, and I also pledge to you at this time the support and hearty co-operation of the Institute in the next

meeting. And to the members of the Institute I wish to say that a year ago I accepted the office tendered me with fear and trembling, but I leave it with only the pleasantest of memories. I thank you."

President Gethro responded as follows:

"Dr. Squire and Members of the Institute: I feel that I shall assume this office with the fear and trembling that our past President experienced when he assumed it, only possibly mine is very much greater. I know that there are many things to be done in an institution of this sort; but I do know, too, that there is great support from all the members, and with that feeling, I accept this gavel with possibly less fear than I should in some other bodies. I do not want to take your time now to say anything more except to express my very sincere thanks for this honor you have given me."

The minutes of the session were read and approved. Adjourned.

ADDRESS OF WELCOME.

MR. JOHN SAYLES, SECRETARY TO THE MAYOR, BUFFALO, N. Y.

Mr. President, Honored Guests, and Members of the Institute:

I naturally feel some hesitation in speaking before such a body of eminent gentlemen. One who has this work to do finds in the course of a year considerable variation. Buffalo is a great center of influence, some of which is of course educational. When your committee invited me to speak this word of greeting I wondered just what one could say that would be of any interest or of any profit to you. I wondered how much he would be allowed to confuse himself with the whole program, how long he might be welcome in his five, ten or twenty-minute address of welcome. And I am still wrestling with that conundrum.

You have met here for a several days' conference. You know more about your ideals and aspirations than any outsider possibly can. If I were here to discuss the philosophy of your vocation you would simply say—"The young man is exposing his own ignorance. The good secretary may have plenty of ignorance on tap, but if he has any of the spirit of Talleyrand in him he does his best to conceal it. But I assure you that the City of Buffalo is glad to have you here on this occasion. We respect you. We respect every educator. We respect every

man in this world who is trying to get something out of it and trying to give something to it. As a matter of fact, you gentlemen do render a distinct service to society, and every man of vision and imagination understands that before I say it. So please start the meeting with this understanding—that you are in a city that respects you, that is glad to have you here, and wants you to stay and enjoy yourselves to the limit.

And while I am here I want to take advantage of just a brief minute to say this: That while we think highly of you, we also think highly of ourselves. Buffalo is an important city historically. It was born since the American Revolution; was burned to ashes in the War of 1812; it is the city of the great Pan-American Exposition of 1901; it is the city of the great Free Soil Convention of 1848. You may not be interested in that last event, but I am sure that that Convention which flung to the breeze the banner with these words, "Free Soil, Free Speech, Free Men," had more effect than Harriet Beecher Stowe or William Lloyd Garrison or Wendell Phillips, or any other single force that polarized the situation and brought on the Civil War. You and I take these things as a matter of course. Other men have labored and we have entered into their labors, but it is a good thing once in a while just to journey back and rediscover and again impress ourselves with the sacrifices that other men have made that you and I might have a free, fair opportunity to work out our destiny.

This is the city of Millard Fillmore and Grover Cleveland. This is the city in which William McKinley passed into the unseen and eternal world; the city in which Theodore Roosevelt took the oath of office as President of the United States. We are a city of nearly half a million people—125,000 German blood and descent, 80,000 Poles, 35,000 Italians, nobody knows how many Irish; they never stop long enough for the enumerator to get their names. We have Scotch and English and Jews, and we have nearly every religion under the sun. And the best of it is, we are a great, progressive American city living at peace with one another, having worked out to our own satisfaction that the only way to live is to live and give the other fellow an even chance to live.

A good many people talk about personal liberty, and when they talk about personal liberty they are thinking mostly of

their own personal equation. The only personal liberty in the world is the liberty that begins at a certain place and ends at a certain place. I can stand right here and swing my fist around as long as I like, and no man has a right to gainsay me on that proposition; but let me step four feet in that direction and begin indiscriminately to swing my fist around and I collide with the President's face, and something happens forthwith—then my liberty at once ceases and his liberty begins.

So in Buffalo, here, we are a half million people—commoners, middle-class fellows, uplifts, mugwumps—and all at peace in Jerusalem. We like one another. We have our differences, we have our difficulties, we have our problems, we have our battles, but after the fight is over every fellow goes around and salutes the other fellow. And that is the American spirit, and out of that spirit we are making a great and beautiful city.

I wish the Mayor himself were here. You would like him. He is a year younger than I am—but only in years, I hasten to say. He is the son of a German peasant—active, energetic, strong, kind and optimistic. There isn't a city in the United States that has anything on the City of Buffalo in respect to the Mayor! There is not a man in this city that appreciates the coming together of men like you more than does he. I am not so sure that you will leave large sums of money behind you; I am not so sure that you are what they call "great spenders"—but I know this: That the intellectual soil will be just a little more fertile hereabouts after you leave the city—the tide will rise, to change the figure, and that all helps. For a city at the last is more than houses and streets and parks and factories and banks and newspapers. The thing that counts in Buffalo, or anywhere else on earth, is manhood and womanhood, and these we have in full measure.

RESPONSE TO THE ADDRESS OF WELCOME.

DR. FRED W. GETHRO, CHICAGO.

Mr. President, Mr. Sayles, Members of the Institute:

Before thanking Mr. Sayles for his address of welcome on behalf of the Mayor, I want to say that I was very glad when Mr. Sayles' fist was going around that he took in only four feet. I measured the distance here as accurately as I could and

estimated what would happen if he took in more territory, because I saw my friend Friesell sitting here. This reminds me of the story of the Irishman who said he could lick any man in the city; then he went on boasting that he could lick any man in the county, and finally, his voice growing louder and louder, he shouted that he could lick any man in the state. And just then a little man gave him a biff on the jaw and he went down, arose, and said: "I guess I took in too much territory."

I can readily understand why Mr. Sayles has been selected to respond to all of these addresses of welcome and eat at all these banquets; it is not hard to see why the Mayor asks him to attend all these affairs. But I am at a loss to know why I have been asked to respond to the address. I did not know that I was to respond until this morning, when some one called my attention to the program. And I have been at a loss to understand that. But I think now, since hearing Mr. Sayles say he had been a theological student, that possibly this may explain why I was put down.

In behalf of the Institute I desire to thank Mr. Sayles for his address of welcome. We certainly appreciate very much the pleasure of being here. As Mr. Sayles has told you everything of importance about Buffalo it only remains for me to express to him and to the people, and especially to the dentists of Buffalo who have provided so bountifully for our entertainment, our feeling of sincere gratitude. We know that Buffalo is a great educational center; we know that it is not only a gateway to the educational activities of the country, but the gateway of a very beautiful country, and we appreciate the opportunity of meeting here. I do not know why it is, but I have attended many, many meetings, and it so happens that this is the first time I have attended a meeting held in Buffalo. But I am sure this is not because Buffalo is not the center, for I believe it is the educational center of the country and a very convenient place to meet.

So, keeping that thought in mind, I am going to again express our great appreciation of the splendid address of welcome that has been tendered to us by the representative of the Mayor.

PRESIDENT'S ADDRESS.

DR. DANIEL H. SQUIRE, BUFFALO.

The aim of this address is to bring about a more active and co-operative interest between the dental examining boards and the college faculties in planning the course of instruction of a dental curriculum. In order that this may be accomplished, it is therefore recommended that the Institute of Dental Pedagogics offer active membership to the dental examining boards under equal conditions with college faculties.

The present century will go down in history as an era of investigation. The unusual progress which has been made in both the scientific and the commercial world will crown it as an age of activity in these broad fields of labor. Never before have such gigantic enterprises been promoted and, notwithstanding the activities of competition, their consummation has been most successful. Let us consider briefly the underlying principles, or the foundation upon which rests the superstructure of our commercial growth. In the opinion of the writer, it is efficiency of service. Every action, every thought, revolves around the main spring of enterprise.

The man of business has become more keenly alive to the importance of concerted effort, than has the man of science. He knows its value. He has shown us that in order to build well, and thereby elevate the standards of a vocation, one must have a co-operation and a unity of purpose among those who are engaged in the work. The large manufacturer has the leading men in his employ trained for their duties in the commercial and trade schools. The merchant educates his employees of merit in the science of business management and accountancy. This is not a work of charity, but one of strictly commercial endeavor, which crystallizes into an efficiency of service for the success of the enterprise. The intimacy of such associations alone will develop a spirit of mutual interest. While it is not the intention of the writer to overestimate the methods of the commercial man, yet, to a degree, this spirit of co-operation, in order to obtain the best service, should invest every dental educator. He himself is a creator, and his handiwork will be manifested in the moulding of the future man of dentistry.

The greatest progress is made when the impetus is uninterrupted and persistent, when men stand shoulder to shoulder

in their demand for higher and better service. Through all the ages, the acts which have been of a permanent nature have not been accomplished by flashes of individual work, no matter how brilliant these efforts may have been. Although Fouchard, Miller, Harris and Black did yeoman service for dentistry, her real strides were made by the universal acceptance of their writings and by a united effort to teach them. From a state of empirical knowledge these acts developed the status of dentistry to that of a college grade. This was not accomplished by one or two men, but by the combined energy of many, who were strong in their faith in the future of our profession.

The compulsory registration of all those who were engaged in dental practice was the first stand made for efficient service. The gradual increase in the preliminary educational requirement raised the intellectual plane of dentistry to that of a profession. It has given to it trained and receptive minds. In the past, the criticism of teachers and of teaching methods always came from those who were engaged in educational work, but today, it may and does come from the rank and file of the profession. The elevation of dental standards has attracted many brilliant men to dentistry, and it is a regrettable fact that more of them are not interested in the work of dental examining boards and college faculties.

Today our forefathers in dentistry are highly honored and their names are closely interwoven with the early history of our profession. Perhaps many of us feel that much could have been gained by having lived during this period of reconstruction and by having participated in the growth and advancement of dentistry. Just as great opportunities await us today, however, as were presented to our ancestors. Therefore, it behooves us to meet these new requirements which are the result of a natural development, the demands of a new era.

At the present time, there are two distinct bodies of men associated in the training of the dental student—the dental examiner and the college professor. The former is the recipient of the highest honor which the profession can bestow. It is an expression of confidence, and denotes an enduring faith in his ability, not only to pass judgment on the final qualifications of the dental graduate, but to advance and to maintain the standards of dental education as well.

The college professor also occupies a place of honor in the profession. His labors are arduous and his life is one of much

self-sacrifice, as a greater portion of his time is spent in the actual training of the student mind. While this position is more or less a self-appointed one, his faithfulness is shown by his devotion to the work—it is always his first duty and he loves it.

These two bodies are the essential factors in dental education, but dentistry will not receive her greatest advancement until the dental examiner and the college professor form a co-partnership and plan together the scope of dental instruction. As long as our efforts are focused upon the qualifications of the future practitioner of dentistry our opinions should not differ at all upon the essentials of his training. The chief trouble which exists today is, that we plan the course of instruction individually instead of collectively. Our intentions are of the best, but, considered as a teaching unit, we lack just that vital thing which means success to the commercial man—efficiency of service. We are not giving to the student the opportunity which he should have for advancement. He is constantly worried in regard to his ability to pass that final State examination, as it often covers work not included in the college curriculum. Such a state of mind is highly detrimental to his best efforts.

Furthermore, the real criterion of dental education is based upon the ability of the graduate to pass the State examinations. A college is now rated by a tabulation committee upon the percentages of the failures of her graduates in these tests, instead of upon the efficiency of her course of instruction. This would be proper if a unified teaching system were in operation, but under the present conditions it has no value whatsoever, because we have one body of instructors teaching what they consider to be the basal principles of dental science, and another group examining upon what they feel are the essentials for admission to dental practice.

Without the least atom of concerted action, these educators are working honestly for a universal grade with a diversified course of instruction. Can we give efficient service when we are not in accord with others' views upon what constitutes a dental curriculum? Such a condition is more like an intellectual sparring match, with the exception that the student receives the impact of the blow.

This plea for more efficient service is made with full recognition of the splendid work which has been done in the

past. It is an appeal for a still closer relationship, so that the members of the profession, and the student body as well, will know that we have a unified teaching system.

The dental student has a right to feel that a college curriculum covers the scope of dental instruction, and that if he does meritorious work he will be able to pass any examination, whether it is given at the direction of the State or the college. It is hoped that sufficient interest may be roused so that the college faculties may have a more active assistance from the State Board Examiners in rounding out the schedule of instruction to its greatest degree of efficiency. From the nature and importance of her work the Institute of Dental Pedagogics is the clearing house of dental instruction. Her melting pot is overflowing with various teaching methods, and, with the aid and co-operation of our esteemed confreres, a course of dental instruction could be planned and executed which would place dentistry in the foremost rank of science.

"Instruction does not prevent waste of time or mistakes; and mistakes themselves are often the best teachers of all."

DISCUSSION.

Dr. S. H. Guilford, Philadelphia

So far as I can recall, this is the first address of a president of a dental society that has confined itself to the presentation and development of a single idea; and for that reason, as well as for other reasons, I think it is to be highly commended. Very frequently addresses of this kind contain a number of suggestions, and when they do, not one of these suggestions is fully developed and brought out in the discussion following. The presentation of but one central idea gives us an opportunity to view that idea and to consider its various phases, in order to determine what we can get out of it.

The President has mentioned a feature of commercial success known as efficiency. We do not like to consider anything that has the word "commercial" attached to it, because it has been so much abused in our profession. At the same time, however, there is an element of commercialism, of efficiency we might say, that we cannot overlook, and when the President speaks of the manufacturer trying to get the best results from his efforts, it bears a very close analogy to what we are doing

in our work. The manufacturer procures his raw material, which is first inspected to see whether it is of the proper quality. It then passes into the factory and is there converted into an article of use, after which it is inspected by the proper officials of the factory to see that no mistake has been made in its manufacture, and finally it is in many cases again inspected by a Government official to make sure that it really is up to the standard. We may recognize the analogy when we consider that in the first place we obtain our raw material and, after inspection by the proper authorities to make sure that this material is fit to go into the college, we take it and to the best of our ability convert it into a suitable product, and at the close of the course it is inspected by the officials of the school to see whether it is fit to go out. Then, after this first inspection, it passes the second inspection on the part of the State to see if everything is all right. So there is a close relationship between the two processes, though one process relates to individuals, the other to commodities.

The President has presented a plan by which he believes the inspectors and manufacturers may get into closer touch, and whereby the manufacturer will produce an article that the inspector can pass, while the inspector will take pleasure in commending the work of the manufacturer. In this way the manufacturers and final inspectors would gradually get closer together. The President proposes that we take into our organization the men who do the inspecting and make them a part of our body. I cannot agree with him there. I think we ought to get closer together and have a more common feeling, but I do not see how a body of teachers can take in a body of men who are not teachers. They are inspectors—it is their duty to find what we have been doing after we have turned out the finished product. But there may be other ways in which the desired result can be brought about.

If the members of the State Examining Boards were to attend our meetings, I question whether they would get exactly what we should consider best for them to have, simply because they occupy a somewhat different position. At the same time there should be some way of getting together. How can this be accomplished? I can see only two ways in which it might be done, and, as the President has said, it is most important that it should be done.

At the present time each school has its own method of teaching, it has its own text-books, and its own ways of demonstrating the subjects taught; and then, without knowing what those various methods are, the examiner takes the student and examines him, and, perhaps, his line of examination is different from that followed in the college where the graduate received his dental education. There is something out of joint there which should be corrected. And, as stated, it seems to me there are two ways in which this could be done. One is by the various schools agreeing upon a common text-book to be used in each one of the different subjects. If all the schools followed the same text-books in their teaching, and the examiners knew this and conducted their examinations accordingly there would be perfect harmony. But the objection to such an arrangement is that, inasmuch as the schools themselves cannot agree on a common text-book, it would be unfair to expect the examiners to follow some text-book that has been adopted by but a portion of the colleges. I do believe, however, that this plan could be made effective so far as the individual States are concerned. For example, take the State of Pennsylvania: If the schools in this State would indicate to their dental examiners that in their teaching they will in the future follow a certain text-book, or even two text-books in each branch, the examiners would, no doubt, agree to examine alone the same lines. I believe this could be done so far as the States themselves are concerned.

The second method by which we might reach a solution of the problem would be this: When the colleges conduct their examinations, once a year or twice a year, as the case may be, if they would have their examination questions compiled and sent to the examiners of the various States, the examiners would know the line of instruction presented in each school, and this knowledge would indicate to them how the students of a certain institution should be examined. That thought came to me in this way: In the last year or so I have received from various State examiners, as have many of you, requests for the questions which have been submitted to the students. They wanted these in order to acquaint themselves with the line of our instruction—evidently the proper idea, and I have always been glad to comply with such requests. The sending out of the sets of questions does not involve much labor, and the object would thereby be accomplished. Whether or not this

is the better plan I am not prepared to say, but we ought to adopt some method by which the two bodies could be brought into closer relation. I have no doubt but some way will be devised to bring about this much-needed change.

Dr. H. J. Burkhart, Batavia, N. Y.

I was very much pleased to receive the invitation from Dr. Squire to discuss the able address to which we have listened. I have also been much pleased to listen to the views of Dr. Guilford, which have been equally well presented.

First, I would say that for a number of years the scheme presented in the President's address has been followed to a considerable extent in this State. And I may also say that for something like ten or twelve years Dr. Squire and myself have been working in harmony to the extent that the State Board examination questions in anatomy have been based upon the definite line of teaching of that subject in the college with which he is connected.

I am not sure that an amalgamation between this Institute and the examining boards would be possible. I can see many reasons why a closer union is desirable. In our high school courses in this State, and in the final examinations, the questions are all based upon a definite syllabus which is established by the Department of Education, or the regents, and that syllabus is changed once in five years. But no questions are given out in the final examinations for the regents' counts, which are not based upon a definite and known line of study. I can see where in dentistry, as we have a number of different text-books, the works of various writers, that it might be quite a difficult matter to formulate your questions according to these various authorities. But I do believe that a closer union can be brought about and an effort made to so standardize the teaching that when the graduate comes before the examining board he is not going to be "thrown in the air" and be confronted by a lot of questions which have no bearing, perhaps, upon the particular line of the subject which he has been taught while in college. We as examiners, strange as it may seem to some college men, do have considerable sympathy for the candidates that come before us. Primarily, the duty of the examiner is to test the practical qualifications of the candidates for practice rather than the theoretical. And the State

will more and more demand that we enlarge the practical teaching, so that, when we finally pass the candidates before the State Board and issue them their licenses, it is something like a guarantee that each candidate passed is fitted to practice dentistry as he should.

I may also say that the New York State Board of Dental Examiners will hold a meeting today in accordance with the suggestion made at our meeting last autumn by Dr. Downing, the Commissioner of Higher Education, that we come here at this time and touch elbows with the teachers in an endeavor to find if some closer union could not be effected; not necessarily that we shall take membership in this Institute, but that some way may be devised whereby we can at least come to a better understanding and not work at cross purposes, as we have in many cases worked in the past. Our Board has always endeavored to be perfectly fair, and has worked in harmony with the colleges in this State. We have, too, always tried to follow the teaching of the various subjects, so that when our questions were formulated they would not be entirely new or would have no bearing upon those subjects as taught in the colleges.

I wish to commend the admirable suggestions contained in the President's address, and to further express the hope, whether or not you finally adopt the suggestions made, that we may be permitted to attend your meetings and receive the benefit of your learning.

Dr. W. C. Davis, Lincoln, Neb.

I was pleased to be placed on the program as one of the three members to open the discussion of this address, simply because I considered it a great compliment for the President to select me as one of those who should consider the remarks which he has made bearing on the one question presented. I think that his desires and yours are the same: For a more uniform and harmonious effort on the part of all interested in dental education to bring about a betterment of our condition as a profession, and a betterment of the service which is rendered to the public. However, in his plan of amalgamation for solution of the problem I would say he is going too far, for I believe this would result in an emulsion just as would occur in an attempt to mix oil and water. This is a great scientific body in dentistry, and, whether or not the greatest scientific body in dentistry, its position before the dental world is entirely that of a producer. The President sug-

gests that we combine the departments of production and inspection—the very thing which, if it took place with reference to products furnished the government of the United States, would put the producer in the penitentiary. Something we must not overlook is the fact that there is a chasm there which does exist and which should exist through all time. It may be we could get into harmonious relation by conference and by visiting the alley after the meeting, as some, being good fellows, prefer, and extending the hand of fellowship. But let the subject of our product be not mentionable between the two bodies.

The President suggests that there is a unity of purpose. There is, perhaps, a unity of purpose on the part of the men who follow both of these bodies, and who have been long in the way. If I speak a little bit plain I hope you will pardon me, as it comes from a knowledge of the facts extending over some years of study. I have had occasion to meet many State Board examiners, and I have noticed that as time goes on, after election to the National Association of Dental Examiners, their attitude towards the cause of dental education changes. You must not forget the fact that many a State Board man is appointed to the office of examiner irrespective of his qualifications as a dentist. The State Board of Dental Examiners is entirely a political body. Less than fifty per cent. of those men, and I say this advisedly, possess the fundamental education which would today admit them to our dental colleges. They are not, as a body, educated men. On the other hand, some of the men connected with that body would do credit to the faculty of any of our institutions. But there are many on the various boards who are not educated men in the broad sense of the term, and unless a man has such education he cannot appreciate the position of the educator.

To go back and analyze the situation a bit, let me cite you to many instances in which a man is member of a State Board of Dental Examiners. It is hatched away back in his own home town when one of you sends to that town an able graduate of your school and he secures a division of practice. I am talking plain, gentlemen. That man gets an idea; he perhaps knows the Governor, who has the appointing power; follows the matter up, secures the appointment, goes to the proper official on his State Board and makes application for membership in the National Association of Dental Examiners, attends the

next meeting of that organization, and there begins his education. The attitude of the new member is that of curtailment of output under the cloak which he wears of higher education, and which he has assumed in order to secure his position. The National Association of Dental Examiners then has to begin, within their own body, the process of educating that man. And if you will investigate the matter you will find that the older members of that organization, those men who have been on an examining board for five years or more, have changed their attitude and have a common thought with us here. That association has to educate its new members, and they lose that all-consuming idea that there are too many dental colleges and too many students being turned out, and then they begin to see the world as we see it. The members composing this Institute have given years of service in the profession in order to come into the organization and not receive a jolt, while those men who are newly elected to the National Association of Dental Examiners would gasp with awe at the ideas which control our every-day action as teachers. This Institute is a scientific body, entirely along the line of teaching. There is nothing political about it. If there is a purely dental institution in the United States it is this organization, more so that other associations of schools, because the one absorbing idea here is scientific education and the turning out of a great product. That body should be left pure and uncontaminated in any way. The National Association of Dental Examiners has sought to control dental education to the extent of exercising an increased censorship of the product, and they have accomplished this. I wish you would look back at the record of the number of students turned out by the various institutions in America on both sides of the line, and then note upon what date the output fell below that number which would maintain the former per capita ratio. If that is not significant as regards the suggestion of control, then I have missed my judgment. But the National Association of Dental Examiners, by education, by retaining their old members and repeatedly sending to their meetings the same men, are getting their membership into much better shape than was formerly the case; consequently, we are now having less trouble. The majority of those men who have been three or four times in attendance at the national meeting are changing their attitude and are not now antagonistic to the schools. That is a fact which is in favor of the entire public.

I am heartily in sympathy with the idea of co-operation, and I believe that outside of this body as a body, that feature has been arranged for. The Dental Educational Council of America, composed of some of the gentlemen who are members of this body and some of the gentlemen of the examining boards, is, through committees, working on the very problems which have been suggested here today. The Tabulation Committee and the Educational Council of America are doing a very great work, and I believe are going to be able to entirely control and handle the very questions which have been perplexing us, and it will, therefore, not be necessary for this body, as a body, to put its fingers upon the work that is being done. Such action upon our part would only serve to hamper the committees, which are barely entering upon the duties which have been laid out for them.

The President suggests that unity of purpose is necessary. That is very true, but that unity of purpose need not necessitate amalgamation of the two bodies. I think there is a unity of purpose in the minds of the men of the two associations who have been long in the way—those men who have, as we might say, had their wings clipped. They see the general trend of the entire profession, and they find that they are more and more going along hand in hand when they have possibly pecuniary reasons for changing or molding their own personal opinion.

I wish to call attention to the harm that is being done by the curtailment of the number of students. All teachers, examiners and practitioners, and even the laity who have some influence, wear the cloak of dental education. We have on a four-corner cap and a long coat and imagine this to be higher dental education, while if we should strip these off, and in each individual case see that which is beneath, one would find something entirely different. It is quite possible that the lessened number of graduates in dentistry has been advantageous in one respect, namely: That of increasing the quality. By a decrease in the number of students in attendance and with no decrease in the number of men teaching, and certainly by an increase in experience gained, the product has improved —there is no question about that. But we must oppose any one who tries to curtail the number of graduates, or the output. If it keeps up, and we are more than twelve hundred short this year in maintaining the per capita in the former proportion,

we are going to be thousands of men behind the number sufficient to keep the per capita the same. This year the number of graduates was about twenty-one hundred, and the number that passed the State Board examinations was something like thirteen hundred short—over a thousand men. Now, the public will soon take note of this condition of affairs if it does not change, and you will find first one State and then another passing laws which will lower the various standards, either in expense of education or in the requirements for admission, for which we, as well as the examiners, have been laboring. We must do something to increase the numbers, and need not necessarily lower the standards or arrange for anything that is more easy. Yet we should do something to attract the prospective student, and especially the young man who would be a credit to the profession of dentistry. How often do we hear the dentist say: "I am the most bedraggled member of a most-abused profession; I feel as though my coat-tail were dragging on the ground; I would rather be a member of any other business or profession on earth that the one in which I have to look down the throats of men and women for my livelihood." We all feel that way many times after laboring from early morning till night. Yet we should assure young men that we do not feel that way all the time. Dentistry is the greatest profession in the world. No other professional man lives in an atmosphere of roses as does the member of the dental profession. It is one continual bouquet after another. Every one that opens the door has a smile on his face—"Good morning, Doctor!"—and he wouldn't have been caught in any other dental office for any sum of money. And when he leaves your office or meets you on the street he will pat you on the back and say, "Doc, you are the best ever!" And if perchance a patient thinks otherwise, he will leave and go to the other man—and why not? Dentistry is the most successful of any profession, and the prospective student should be so informed. We succeed in nearly every undertaking we accept, and if perhaps once a month we make an utter failure and lose something we meant to save, it will disturb the sleep of an honest dentist and a good teacher: How did that ever happen?

Let us consider the conditions that exist in other professions. In the legal profession there are but two sides—one must lose and one must win. If at the time of his death a lawyer has saved one more case than he has lost, he is better

than the average success. How about the physician? If he live to a ripe old age he will bury nearly all of his patients. And when it comes to the clergyman, the Bible says: "For many are called, but few are chosen." Most of the clergyman's efforts end in failure, and a success he can remember for days. An attorney is glad if he has success half the time, a physician must bury nearly all of his patients, while the member of the dental profession achieves success day in and day out, with his patients throwing bouquets at him, and if they do not all pay they are kind enough to hold their peace. I love my profession more and more the longer I am in it. It is simply a bed of roses, one success after another, and this is the experience of all the practitioners I meet. But what about being a little tired and telling the young men we meet on the street: "Don't take up my profession, don't do it; I have to stay indoors so much, I could not ride in my automobile more than six hours today?" Ours is a great profession, and I hope we will do something to increase the number of entrants, the requirements remaining where they are. Let us increase the numbers by telling the truth about our profession to offset the efforts which have been made, and which possibly may be made in the future, to curtail the output. I am in favor of the extension of the glad hand to any other organization, but I am not in favor of seating them beside us with an equal vote and equal membership, because no other set of men as a group occupies the same position in the world.

Dr. C. R. E. Koch, Chicago

I do not know that I ever listened to a paper read before any association that more deeply interested me than has the one to which we have listened this morning. It is sound in reason, it is sound in sentiment, it is sound educationally. The only question that came to my mind was that if this association took upon itself to determine the questions which are involved and to which a reasonable conclusion would lead, whether it would not get away from its own sheet-anchor—the sheet-anchor which has, I believe, made the Institute so effective for good as a teaching body. I have always looked upon this association as purely a teaching body—a conference of teachers with reference to the teaching proposition, and not a body mixed up with politics or having political relation to other bodies or to the people.

But I am not here to say that it will be right or wrong for the Institute to take up this other question and all the questions to which it will lead. I am free to say to you that if this body does take up this question and to decide upon it, there will no longer be any need for faculties' associations, either one of them.

The question of preliminary education has been prescribed for us by the gentlemen referred to in the President's address as 'the inspectors." It is a very practical presentation of facts, although it may smack of commercialism. We are in a sense the manufacturers who have undertaken to serve the people in the field of making dentists, and the people have attempted to prescribe certain conditions, to which we must accede or our product will be thrown out. So the subject is a worthy one, and I hope it will be discussed and that the influence of this body, whether here or elsewhere, will be in the direction of higher attainments, a closer conformity in our teaching methods, and the attainment of better results. But we wish to call your attention to the fact (we discussed this question yesterday in the meeting of the Faculties' Association) that it is almost impossible to have in the various sections of our country or in the different schools, curricula that are identical. We are each surrounded by local environment, both local to the school and local to the section in which we work. These cannot be eliminated by making a wholesale arrangement for all. There must be a certain amount of latitude, and if the Dental Educational Council is the body that may be recognized by all the interested associations as a clearing house to settle these questions, I shall say amen to that.

Dr. Davis has made an important observation here, though I think his figures are a little incorrect. Unless we do educate a sufficient number of dentists to serve the people (and I am prepared to say that so far we have not been able to do this), the people will soon rise and say that we are trying to get up a "corner" on dentistry, and that they will not allow us to set up standards that will prevent an additional number of men from coming into the profession. We have to exercise caution and judgment and we have to be politic. The fact is that at the present time there are in round numbers forty thousand dentists. We know absolutely that three per cent. of dentists will die each year, and if we add the losses that must come by reason of the presentation in many cases of a more lucrative

proposition, and also because of old age or retirement, sickness and misfortune, it is safe to add two per cent. more. This means five per cent. of losses, or the necessity for two thousand new dentists each year. We not only have to keep up the equilibrium, but must remember that there are a million new people coming in every year, which in proportion would mean that four hundred additional dentists are required from this cause. The secular press, the medical press, and our own, are all laying great stress upon the fact that the mouth is the port of entry to health. The public is demanding more, and we must not forget this when talking about going up higher and higher. The fact is our college reports show that last year we had in round numbers twenty-one hundred graduates, which is the highest number in eight years. The report of the National Association of Dental Examiners shows that thirteen hundred and fifty of the graduates passed the boards. Now, there are graduates unaccounted for to the number of seven hundred fifty. I cannot believe that these were lost to the profession. Many of them did not take the State Board examination. Perhaps quite a number, I do not know the percentage, were educated, to use the manufacturing term which has been made permissible, "for the foreign market." I do not know how far that extends. But it is certain that even last year we did not educate a sufficient number of men to fill the vacancies that existed. There are, of course, a number of graduates who have not been reported because they did not see fit to take the examination at the time, but will receive a later examination.

I want to protest against the position which we take as a general proposition that faculties of schools and the individual teachers are all holy, and that examining boards and examiners are all corrupt. I believe that the personal equation will compare favorably, and we must put up with the conditions that exist in a harmonious, kindly spirit, in a persuasive manner rather than in one assuming dictatorial superiority, if we wish to accomplish the things for which the President in his address stands, and in which I most heartily concur.

Dr. H. E. Friesell, Pittsburgh

My ideas on this subject are, I believe, sufficiently well known not to merit another discussion. And I was endeavoring to keep quiet until the remarks made by Dr. Davis interfered with this purpose.

The idea set forth in the President's address is a correct one. It crystallizes a situation that we as teachers and our students must face. It is a very serious situation, and is due to a lack of harmony between the ideas of the examiner and the ideas of the trained teacher as to what constitutes a proper education or knowledge in dentistry. We take it for granted that every examiner and every teacher is alike honest in his efforts; we have no right to assume otherwise. But that there is a great lack of uniformity in the ideas as presented through the questions of various examining boards and the ideas as taught in the various college curricula is certainly very plain. And this is a serious matter, because it means that the teacher much teach dentistry as he understands it and as he has studied it up to a certain time in the course; and then, in order that the student who has been under his care shall be able to secure a license to practice after he has been graduated, the teacher must in many States begin to teach that student a different kind of dentistry. He must reverse himself on many principles, not only in the details, but actually on principles. Then when the student comes up before the examining board it is with a confusion of ideas. In the last three months of the term the senior student is worried over passing the subjects of the senior year; he is worried over learning what to say in answer to the various questions which may be asked; he must reverse his ideas on nearly everything in order to pass certain State Boards, and then he must also rummage over the things that good pedagogy has given him during the first and second years. Imagine the state that student's mind must be in when he comes before the State Board. Anything within reason that will bring about a unification in the minds of the State Board members and the teaching faculties of this country will be a much-needed and a radical advance in dental education. The colleges cannot do it alone with this State Board examination facing the young graduate.

Now, as to whether the solution of this problem shall be assisted by tendering to the members of the various State Boards membership in the Institute of Dental Pedagogics is an open question. Personally, I believe that we should invite, as we have frequently invited, members of the adjacent State Boards to the meetings of the Institute, and I think this matter should in the future be looked after even more carefully than it has been in the past. I doubt whether membership in the

Institute would accomplish any more than would the presence of members of the Boards upon invitation.

In my opinion this Institute has among its other problems one that is very important and that will bear directly upon this idea as set forth by the President. The problem referred to has been considered before, and the solution advised has been this: The establishment of syllabi on the various subjects taught in the dental curriculum; the principles laid down in those syllabi to be those that are accepted by the majority of the men teaching in the institutions of the country. These syllabi should be accepted and followed and examined upon by the various State Boards. And when a State Board shall go beyond the principles laid down in these syllabi, it will be deemed that that Board has laid itself open to the necessity of demonstrating the position it takes if this be different from that of the majority of the colleges.

What do we mean by the establishing of these syllabi? Simply a standardization as far as common sense permits—not a mechanical standardization, but a common-sense standardization—of dental curricula. And, gentlemen, that will have to come, whether it is that some do not like the term "standardization," or whether they do not like the idea.

We have a commission on text-books which has as its purpose the preparation of text-books that will give standard information, accepted dental principles, to examiners and teachers alike. The work of this commission on text-books should progress more rapidly than it does. Those of you who are able to do so should study the problems in question and should write text-books that can be adopted by this body. And I want to say in this connection that any member of the Institute who is writing a text-book for use in dental educational work should, before publication, submit it to the commission on text-books of this Institute.

The work of the commission on nomenclature is another splendid movement that has been carried on by the Institute, aiming at this same thing—the standardization of terms. A State Board examiner asks a question, using a term that he learned some twenty to forty years ago, or he asks for the description of a method which he designates by the name of some particular man whom nobody knows outside his own State. This seems a little thing to the examiner; but what does it mean to the student? Perhaps a loss of ten per cent.

on that particular subject. The work of the Dental Educational Council in establishing a standard curriculum is also an effort along these lines.

So we may see that everything in dental education is pointing in the same direction and along the line mentioned by our President, when he called attention to the need for a unification of the ideas of the dental examiner and the dental teacher.

Dr. Squire (closing the discussion) I wish to thank those who have taken such an active interest in this paper. It has been in my mind for a long time that the student did not have a fair chance—that is, he did not have the best chance that he should have, and that the Institute of Dental Pedagogics should be the body through which this change might be made. It stands for everything that is high in educational work, and I do not think that politics would enter into the work of this Institute if the members of the State examining boards were invited to join with us. When this body is taken in any dental faculty it is admitting rather crude material, and I do not suppose it would be any more disgraced by taking in the dental examining boards than when, for instance, it admitted to membership the faculty of the University of Buffalo. We consider ourselves, perhaps, in rather a unique position, as being the greatest exponents of dental education in this country. But we have all arrived at that position since the organization of the Institute. We were not of that mind when we started in here as members, and I hardly think that we should let a question of politics (which does not interest this Institute at all, and I do not see how it could be injected into the discussion) deter us from asking the members of the examining boards to join us with the view of betterment in dental education. I do not think that should enter our minds at all. We should be a little more liberal than we are. If we are going to do the best good possible we must extend our limits, and we must not feel that it is beneath us to take the inspector in. I dare say the manufacturer, if he is going to keep out of the penitentiary and be successful, will have to find out what kind of goods the inspector wants; then he will furnish it. And that is what our idea is. We think in this State we have things down to a science, and we think we are pretty well off as far as the educational requirements are concerned; but I think it rather

shocked the members of faculties of the dental colleges in this State when, out of 197 graduated last year, 179 took the New York State Board examination, of which number 119 were passed and 60 "plucked." Does that look as if we were in full accord with the scope of dental instruction in the State of New York? Is that fair to the student? What do you imagine the students' ideas are as to the efficiency of the educational department in the State of New York as regards the dental colleges and the State Board of Dental Examiners? Now, I know positively that the dental examining boards are fair and they are honest. The members of the Board in this State are fair and they are honest, and Dr. Burkhart has referred to an understanding which we formerly had in regard to co-operation in anatomy. When I was professor of anatomy, and had to study that subject, I do not think it would be any harder for any member of a State Board to study his subject than it was for me to study that subject or for any of you to study your subject. We would not study those subjects if we did not have to. But when Dr. Burkhart and I were in a co-operative spirit in regard to anatomy, I never lost a student before the State Board. During fourteen years we did not have one student "plucked" in anatomy. I do not lay this result to good teaching, but to the co-operative spirit. Dr. Burkhart told me his idea as to the teaching of anatomy, and I taught the subject accordingly. If we could get together with the dental examiners and find out what they want taught, and teach it, I dare say they would approve this plan and find it as much to their advantage as to ours. They could come here and see our technic, our cavity preparation and the methods by which we are teaching that subject, and they would be just as much interested in these features as any of us. Now, if this Institute is going to be the supreme body in teaching, why is not that good service? It is appalling to think that in the State of New York alone 60 out of 179 graduates should be "plucked" in one year, and this is not because the colleges are not doing good work. We are all doing good work, we are all sincere, but it is simply because we are not together.

THE PROBLEM OF TEACHING ORTHODONTIA IN THE DENTAL SCHOOL.

DR. C. A. HAWLEY, WASHINGTON, D. C.

When the writer was invited to present a paper before this Institute on the subject of teaching orthodontia in a dental

school, he chose this expression of the title to represent somewhat his attitude of mind upon the subject. Especially so far as clinical work is concerned, it is a problem that is difficult of solution, and I have not the temerity to come before you and claim to have accomplished the task. I wish to discuss the nature of the problem without presenting dogmatic conclusions, and hope that any suggestions I may make will be received in the same spirit.

In view of the fact that orthodontia has made such unparalleled progress and been thoroughly established as a specialty only in the last ten years, it is natural that there are held two views on the question of its teaching in dental colleges: One, that on account of its increased importance, a very much greater time should be given to its teaching in the college curriculum. The other, that as it is manifestly impossible to give a complete course in the time allotted in the present curriculum, it should be left to the post-graduate schools, and not be taught at all. Neither of these views is, in my opinion, tenable.

The adoption of the latter view would in a short time compel all this work to be done by specialists, which is neither desirable nor possible. It will always be desirable and necessary, especially in the smaller cities, for the general dentist to care for cases of this kind, and always be necessary for the general practitioner to know the fundamental principles of orthodontia. For, on account of this rapid progress in orthodontia and the well-known persistence of some former ideas, it often requires exhaustive mental gymnastics on the part of the orthodontist to prevent discrediting the dentist in the eyes of his patient on the one hand, and be absolutely true to the best interests of this same patient on the other.

In view of past history of systems in orthodontia, it might be pertinent to mention what principles should be taught. While a cursory glance at some of the discussions on orthodontia has, no doubt, given some cause for the impression that all orthodontists are descendants of attendants of a Donnybrook Fair, yet this impression is erroneous. The subjects in controversy are not those involving the principles that would enter into the limits of a college course.

There are at present about one hundred and fifty men in this country devoting their entire time to the study and practice of orthodontia, and upon the vital principles of the science they are unanimously united. These principles have survived

all controversy and undoubtedly should form the basis of college work. I would emphatically say that any college course should begin with a study of these principles. The teaching of laboratory courses in construction of appliances, or any attempt at clinical work without this foundation must be manifestly wrong.

In order to make myself perfectly clear as to what I mean by these general principles, it might be well to consider briefly the development in orthodontia in the last ten years.

Orthodontia has been recognized as an important branch of dental science since Fouchard's writing in 1728, and attention to its art has steadily increased up to the present time. It was about ten years ago that there was launched before the dental world what was then termed the new school of orthodontia, marked particularly by the establishment of a post-graduate school for the training of specialists in the science. This school was the outcome of the recognition of new principles. The founder of this school and the man whom we honor as the author of the new principles is Dr. Edward H. Angle. Let me emphasize new principles to correct a common impression that the new school meant new appliances. It is true that Dr. Angle did about this time present to the profession new appliances, which were almost universally recognized as more efficient and simpler than any heretofore used. These appliances since that time have been greatly modified and improved, but the principles have remained the same and in essential character have been universally accepted. They are essential and vital to the art of orthodontia.

As might be expected, these principles have been developed along many lines. A suggestion of what I would consider essential for a student course will be understood by following outline:

First, occlusion of the teeth, or the normal denture. Before we can have an intelligent conception of the abnormal, the normal must be known. So by occlusion, we mean the normal denture. And not only the normal denture at maturity, but the normal deciduous denture and its normal condition at every age and every stage of development to the full denture. This prepares the way for a recognition of any deviations from the normal, or malocclusion.

The first step in the study of malocclusion is its classification. Dr. Angle's classification is accepted by an overwhelming

majority of orthodontists as the simplest and most useful and as most clearly pointing the way to correct treatment. In a college course I think especial attention should be paid to the beginnings of these types of malocclusion in the developing denture. Their modifications, their etiology and characteristics should be carefully studied and the effect they produce in the face, the nasal passages and the skull.

After the study of classification I would take up the character of the alveolar process and a study of tooth movement as limited and controlled by the nature of this tissue—the possibilities of its modification and growth and the dangers and benefits of the different kinds of movement. We should also consider the pathology of inflamed and diseased conditions caused by improper treatment.

Next I would take up the general principles of treatment of each class separately, with a discussion of the problems presented by each at each stage of development, as much historical reference to the development of treatment as is necessary to make these methods plain and clear, and an illustration of the results that may be expected in each typical condition in each class at different ages. The illustrations of results should be as full as possible to build up in the student's mind an ideal of correct treatment.

Following this, a discussion of retention of the teeth in its general aspect and the application to the problems presented in each class.

This course as outlined could be covered in about ten lectures and would give a good foundation for future study. It would give such a knowledge of the principles of orthodontia that the student could recognize malocclusion in its beginnings and give intelligent advice as to treatment, as well as recognize correct results. At least this much should be given in every dental school. There are at present being treated by specialists in the United States about two thousand patients every year, and the number is constantly growing. These patients and their near friends are rapidly becoming an educated laity and are naturally somewhat critical of the advice given by the general dentist, making it almost imperative that the future graduate should know the fundamentals of correct treatment in orthodontia.

It will be noticed that this course could be given with very little mention of appliances. I would avoid their mention

as much as possible in these preliminary lectures in order to divorce from the student's mind the prevalent idea that a system of appliances constitutes orthodontia. While the importance of correct appliances cannot be overestimated, yet principles and results must stand by themselves, and it must be recognized that a result might be reached by several methods. In other words, emphasize principles, not appliances.

If the curriculum would permit additions to this course, I would follow with lectures on appliances and their adjustment, supplemented with a laboratory course in technic. By this laboratory course, I do not mean instruction in drawing wire or cutting threads or making nuts or bolts. These things can be purchased far more perfect in form from their manufacturers. The course should include free-hand soldering and fitting of appliances on models.

We should now be ready for clinical work, if it is decided that a clinic be established.

It is in the management of a clinic that we meet the real problem in teaching orthodontia. The difficulty lies in the fact that completion of the treatment and retention extend over several years of time, and that the amount of skill involved in so treating a case, that it may be worth while and not dangerous to the patient, is more than the average student possesses even in the senior year. There is no other clinic like it in the domain of dentistry or of medicine and surgery. In the other fields of dentistry, crown and bridge work and all the lines of operative dentistry the operation is completed within a short time. In the most difficult fields of surgery, rhinology, ophthalmology, etc., the operation occupies an hour or two at the most, and a few weeks in the hospital completes the case.

In orthodontia, even with a skilled operator and in most favorable surroundings, where time is strictly economized, the treatment occupies from six months to a year, with a retention period of perhaps two years more. With the waste of time, which is unavoidable in clinical work, few cases can reach the period of retention in one school year. And these cases, with an importance not exceeded by any operation in dentistry—nor, indeed, by many in surgery—should not be trifled with and should not be left unfinished. They should not pass from one operator to another who may be indifferent and not familiar with the details of the case.

Without going into further details, I would suggest an arrangement that, it seems to me, would promise success. A competent man should be in sole charge of the college clinic, and should be permanent or should have charge for a term of years. I would have this man do all the work on the cases, the students being privileged to look on, as in a surgical clinic. After a course of laboratory technic in adjustment of appliances, then the privilege of observing the application of this technic in a number of cases, which, of course, would be in varying stages of treatment, then he would be in far better condition to undertake cases in his practice than if he were to spend the time in the attempt to start one or two himself. I am not in favor of clinical work in a dental college done by the student. You may say that the same obtains in all clinical work, but the result is not the same. If an inlay or crown or bridge or filling is imperfect, it can be thrown into the scrap box and another made without serious injury to the patient. It is not so in orthodontia. When the teeth are unskillfully moved the injury may be serious and irreparable; besides, the loss of time carries the case beyond the possibility of successful termination.

Probably the next question you would ask is: "Where can such men be found who would be willing to take charge of a college clinic for a period of time?" The best answer I could give is: "From a post-graduate school for the training of specialists in orthodontia." No post-graduate school exists at the present time, or is likely to in the near future, that gives its students adequate clinical experience to start them in practice as specialists. The demands in training of a man entering this field are becoming more and more exacting, as they must enter fields already occupied by men of experience. The practical work of a college clinic might be valuable to prepare such men to take up private practice.

These, in a general way, are the conclusions I have reached on the question of teaching orthodontia after some years spent in attempting a college clinic and another term of years spent in the practice of the specialty. Many details could not be included in the limits of the paper, but can properly be left for later discussion.

Below is appended an outline of the lectures delivered at Georgetown University. They are illustrated by about one hundred and fifty lantern slides:

LECTURE I.

Introductory remarks on extent of course. Field of orthodontia. Area of face included in development of the teeth. Direction of growth. Normal denture at age of three, at five, at six, at seven, etc., to the complete denture. Perfect occlusion.

LECTURE II.

The normal face. Effect of normal denture on face. Effect on nasal spaces and internal structure. Normal form of arch. Bonwill's laws. Determination of the normal arch in orthodontia.

LECTURE III.

Angle's Classification, Class I. Normal mesio distal relation of the lower teeth to the upper. May not be in normal occlusion. Malocclusion usually confined to the incisors and cuspids. Regions of maldevelopment. Narrow arches, usually both upper and lower. The so-called open bite in this class. Etiology.

LECTURE IV.

Class II, Divisions I and II, with sub-divisions. Facial deformity peculiar to this class. The beginnings at early ages. Etiology. Class III. Characteristic facial deformity. Etiology—first beginnings. Effects in later life.

LECTURE V.

Physiological changes in proper movement of teeth. Absorption and deposition of the bone. Bending of the process and movement en masse. Bodily movement of teeth. Opening of the suture. Lines of least resistance to movement in the maxillary bones. Natural tendency to movement in development. Pathological results of unskillful movement.

LECTURE VI.

Treatment of Class I. Determination of the normal occlusal lines. Direction of movement. Influence of abnormal roots. Devitalized teeth. Impacted cuspids. Some requirements of appliances in this class. Results of treatment. The open bite.

LECTURE VII.

Treatment, Class II. Four important points of abnormality—(1) Disparity in sizes of upper and lower arches, (2) Distal occlusion, (3) Abnormal overbite, (4) Abnormal inclination of incisors. Absolute necessity of correcting and retaining all of these conditions. Normal relations of upper and lower lines of occlusion. Disturbances of this relation and cause. Correction of distal occlusion. Intermaxillary force. Management and results of this force. Stimulation of forward growth of lower teeth. The temporo-maxillary articulation at different ages. Limits of movement of condyle in glenoid cavity.

LECTURE VIII.

Treatment, Class II (continued). Abnormal overbite. Cause—non-eruption of molars. Excessive eruption of incisors. Methods of correction. Effect on face. Abnormal inclination of incisors in Division I. In Division II. Correction. Effect on lips. Sub-divisions of each division. Difference in treatment. Illustrations of correct treatment and results.

LECTURE IX.

Treatment of Class III. Ease of treatment at early age. Lingual occlusion of upper molars. Inclination of lower incisors. Limitation of movement of condyle backward. The middle third of the face. Most difficult class to treat at maturity. The sub-division.

LECTURE X.

The retention of teeth. Cause of failure. Length of time required in general cases. Tendency of return movement in each of the classes. What may be left to nature and what must be done mechanically. Illustrations.

DISCUSSION.

Dr. Abram Hoffman, Buffalo.

I wish to congratulate Dr. Hawley upon his excellent and timely paper, and particularly want to thank him for the closing paragraph, wherein he stated that he would leave the laboration of the course to be brought out in the discussion, because his doing this gave me oppor-

tunity to discuss the paper, with which I am substantially and entirely in accord.

Dr. Hawley speaks of his temerity in suggesting a course in orthodontia. I regard Dr. Hawley very highly and have great respect for his knowledge of the subject and his skill as an operator, and if he undertakes the problem reluctantly, it certainly seems somewhat presumptuous on my part to try to outline a course. I did not have his list of lectures until this noon, and, with reference to his course, I am fully in accord with all he has said.

The problem of teaching orthodontia in the dental school is not alone the problem of the teacher, but, from all that I have been able to gather, a problem with the faculty as well. The rapid advances in this science since our last paper relative to its teaching necessitates a thorough discussion as to its place and scope in the curriculum.

The importance of the work that is being carried on by the orthodontist is no longer questioned, and the demand for skillful operators is much greater than the supply. The supply in the past has been from the ranks of the dental profession, principally through two channels—i. e., post-graduate instruction or "the school of hard knocks and experience." There seems to be much difficulty and many obstacles in maintaining a well-established post-graduate school. The Angle School, for instance, has not held annual sessions, and it is two years since any course has been given, so its future is indefinite. In addition to this condition, there are some eminent men who are of the opinion that the orthodontist should no longer come from our profession, but should be the product of an entirely different school, with a distinctive degree after several years of study. It is not within the scope of the paper to discuss the practicability nor the advisability of that point, but these are two ideals that have failed to materialize; therefore, it is prima facie that we must instruct the student in a sufficient measure—first, so that he will be well grounded in the basic principles of orthodontia; secondly, so that in addition to the above he may develop in the practice if he so desires, especially after his adaptability has been considered and in the opinion of the professor he can meet all of the requirements of the orthodontist; thirdly, so that he may quickly increase his knowledge under the tutelage of eminent specialists if he so desire, there being something better than the raw material to start with.

Dr. Hawley, and he is not alone in the thought, is rather skeptical as to the advisability of the undergraduate treating malocclusion in the clinic. What dental school today would think of graduating a student who had only seen the demonstrator treat teeth, make fillings, crowns, bridges, plates and the like? The fact is that the practice of orthondontia is different and requires much painstaking care, skill and judgment, but is not the earnest, capable student entitled to participate in this branch of our modern dentistry the same as in casting, prophylaxis, the treatment of pyorrhea, removable bridge work and other modern ideas? The speaker believes that he is, and that it is up to the college to provide adequate instruction.

Permit me to outline briefly the course of instruction that we are establishing in the University of Buffalo, Dental Department:

The subject of orthodontia is divided into "required" and "elective" courses. Every student attends the lectures in the required course. These are given in the junior year, beginning shortly after the holidays. In general, they embrace an historical sketch, the consideration of former methods, the various general definitions of orthodontia, occlusion, malocclusion, key to occlusion as given by different authorities. This also includes nomenclature, normal occlusion of the deciduous and permanent dentures, the transition from the deciduous to the permanent denture, the development of malocclusion, the classification of malocclusion (in accord with the essayist we teach the Angle classification), etiology, the naso-pharynx (by the special lecturer on the nose and throat), facial harmony and balance, including temperament and type. These lectures, with the oral quizzes and an examination, are given in about eighteen hours. The importance and advantage of these lectures to the student and general practitioner is apparent, enabling him to early recognize deviations from the normal by developing dentition to give intelligent advice to the patient, to recommend a competent specialist and to intelligently judge results.

At the termination of the general lectures the students express their desire to take the elective course and counsel with the professor, as he is probably the best man qualified to judge their ability. The class then starts the laboratory technic, and, contrary to the opinion expressed by the essayist,

I believe in wire and tube drawing, nut and bolt making, ribbon making, tempering of metals and similar instruction, on the theory that this practice is as essential in orthodontia technic as is flasking in prosthetic technic or instrument-making and tooth-carving in operative technic. The laboratory work further includes a variety of exercises in soft soldering, hard soldering (both free hand and fixed), plain and clamp band making, the adjustment of appliances upon models, the construction of retaining devices and impressions and models.

The lectures for the advanced students should include a review of dental anatomy, a review of histology and embriology as applied to the oral tissues, changes in the alveolar tissues during and after tooth movement, dynamics of tooth movement, anchorage, adjustment of appliances, the principles underlying the treatment of the several classes by classes, retention, care of the mouth during treatment; records, including cards, photographs, radiographs, etc.; office management, as applied to consultation, fees, etc.

As Dr. Hawley says, the demonstrator should be a man of experience and, I would add, enthusiastic in the work, for with such the comfort of the little patient will not be overlooked and the teaching at the chair will then be invaluable. The infirmary fee should be sufficient as to enable the school to employ such a man, and he should have the run of the infirmary cases in mind as well as he would have his own private cases in mind.

The "elective" is expected to attend the Saturday morning clinic during the closing weeks of his junior year, observing the cases and the operating of the senior student and the demonstrator. These are very often the boys who take advantage of the summer course and thus help to solve the difficulty of caring for this increased and exacting infirmary practice in the vacation season.

I am not the only person who has failed to interest some eighty per cent. of a senior class in orthodontia practice—at least so I have been told in private conversation—and the problem has been: How should we make the most of the student's time, of the teacher's time, and still improve the curriculum? The advantage of the plan as outlined should be apparent.

The student, when assigned a case, is given a record card upon which are recorded the following rules:

The professor of orthodontia reserves the right to pass upon the eligibility of students for the elective course in orthodontia.

Only those students who have registered for the elective course and those who have supplied themselves with the prescribed instruments and equipment will be assigned cases.

Cases will be assigned, at the discretion of the teacher, in the order of matriculation.

Each case must be presented for inspection to the demonstrator in charge at least once each week.

Upon being assigned a case the operator will procure from the office a "student's record," which is to be carefully preserved, neatly filled in, and returned to the office before the final grading will be given.

The student is required to make a suitable entry upon this record noting each visit of the patient and the service rendered. The signature of the demonstrator must be procured for each of these notations.

Under no condition will any credits be given until satisfactory models have been deposited in the model cabinet.

The final grading or marking in "practice" will be based upon the **general efficiency** and the **quality** of service rendered.

The time, extra work and credit for the course is made possible by a simple arrangement in our "laboratory and infirmary point system." Briefly, the requirement for graduation is a minimum of one thousand points in operative and prosthetic dentistry—five hundred points in each. If a student elects to take the special course in orthodontia, the total requirement remains at one thousand points, but one hundred each are taken from the two major subjects, and the total of two hundred becomes the minimum in orthodontia.

The plan in general, as outlined, is in its second year here in our Buffalo school, and, while not complete or perfect, is working out in a very satisfactory manner. It is not our purpose to develop specialists, but to prepare the student so that he will be better informed, of greater service to the community and a competent dentist.

Dr. S. H. Guilford, Philadelphia.

I am much gratified with Dr. Hawley's paper. It is well prepared and the subject is adequately brought out and developed. I suppose that as long as the teaching of orthodontia continues there will be various ideas as to the best manner in which to present the subject to the student. One point particularly which the essayist has made is absolutely correct, and that is, as in all cases, the main thing to do is to teach principles, to instill these in the student's mind, because they are the foundation, and without them

we can accomplish nothing in an orderly way. It is for this reason that in the teaching of orthodontia I begin, first of all, with an explanation as to what is normal in the human mouth so far as the teeth themselves are concerned, so that we may know what is the normal and natural position of the teeth in each arch, as well as their relation to those in the opposite arch, commonly called occlusion. I then proceed to develop the matter as far as possible along regular lines. After the students know what is normal they understand perfectly that anything which differs from this is absolutely abnormal. I also show them that very frequently there may be a slight abnormality which may not require the interference of the dentist, but that, as a rule, all abnormalities do require it. Next, I pay particular attention to the matter of dentition. I want to demonstrate to the students, as they have been taught by other chairs, how the deciduous teeth come into place, their position and their importance, and also the great value of preserving these teeth because of their bearing upon the future permanent dentition of the individual. After that I take up the permanent teeth and speak of them in the same way. In regard to the deciduous teeth, I also lay particular stress upon the fact that they should not be retained beyond their proper time, and, more important perhaps than that, that they should always be retained in their normal form, that this is unaltered by caries unless that be corrected by filling. I then speak about the etiology of the condition, telling what we really do know at the present time in regard to the different influences that bring about irregularities and malpositions of the teeth. All those factors come under the head of principles.

We then take up other phases of the subject, such as the different conditions which so frequently interfere with normal occlusion of the teeth, and from that on to the various methods of changing the position of the teeth. We consider the mechanical principles, showing how force may be applied to the teeth in order to move them, how that force may be physiologic or perhaps pathologic—the evil results that may follow too rapid movement of the teeth. I want the students to understand the principles of the subject, and introduce dynamics to the extent of knowing what force to apply, how best to apply it, and how best to regulate it. I want them to understand, also, that in the application of force we have various instruments, as the screw, spring, etc., all of which are effective under certain

circumstances. I illustrate these things by means of an enlarged model. I have a very large model of a human mouth, with the teeth loosely in place, the sockets being much larger than the teeth, the space between the teeth and the walls of the sockets being filled with modeling clay. This furnishes movement so that I can place the appliances upon them and show the application of force and the way the teeth can and should be moved. But so far as that is concerned, I presume most teachers of orthodontia follow this or some similar plan.

The most important feature is the clinical teaching of the subject, and herein lies the difficulty that Dr. Hawley has had. He seems to feel that the clinical teaching of the subject is attended with great difficulty. In a certain sense it is, and in another sense it is not. I do not find great difficulty in that respect, because, in the first place, when I am lecturing upon this subject, the students in the laboratory are engaged in making different fundamental appliances, as bars, arches, etc. I agree with the last speaker and disagree with the essayist in the matter of the students being obliged to construct mechanical appliances. I think they should do so, because they may be called upon to do it in future practice and their hands must be properly trained. We provide each student with an envelope containing all the materials he is going to use that year in the way of wire, metal, etc., and we see that he has all the tools necessary for the manipulation of those materials in making the different appliances which we require. By this means the student acquires a certain facility in manipulation. He learns to do these things. Many of them he may not do after graduation, but all of them he will be obliged to know.

After the student has made the appliances they are fitted to a plaster model. Each year I take a model which I think represents an average case of irregularity, perhaps of the upper jaw, sometimes of the lower, and that model is reproduced by the gelatine process, one hundred or more models made from it, all alike. Each student receives two of these models. The first model is used in the fitting of the appliances, after which they are adjusted to the second model and handed in for inspection.

We give them next practical cases, and the practical cases are always assigned and afterwards seen on Saturday mornings, because that is the time when the school children can

most conveniently come. Every case that presents to the college clinic is seen by myself, and I have as assistant a capable man of considerable experience in this line, and he and I work together. After the patient is placed in the chair this demonstrator and I examine the case in the presence of six or eight students, questioning them to find out what they think should be done. I then give my decision, showing where they were wrong or right, as the case may be. After coming to a conclusion and deciding upon what we believe to be the best way to treat the condition, the demonstrator takes a card and outlines upon it what we have decided upon, and what form of appliance is indicated, this appliance to be made before the patient comes again. Sometimes we assign a case to two students who work together upon it, making the appliances between them.

When the patient comes back to have the appliance put in place we have the student adjust it; we want him to learn how to fit these appliances in the mouth. When he blunders we help him. But I think it is impossible to teach this subject in anything like a practical manner without compelling the student to do for the patient all the work that is absolutely necessary. I think he himself should, under instruction, do every bit of it, because the demonstrator is present all the time overseeing the work and can always be called upon for advice or assistance.

When all this is done what has been accomplished? First of all, the patients are, I believe, well cared for, because they have somebody with experience to advise them, and everything that is done is carried out under his supervision. In the second place, the student gets a practical knowledge of what he will have to do when he goes out into practice. That forms the foundation upon which he can build—a very good foundation, too—and we have no difficulty about it. The only difficulty we meet with is that students are not particularly interested in the work. But whether they are or not, I compel them all to listen to the lectures, and the demonstrations given to illustrate these. They must have the fundamental knowledge and be examined upon it in order to prove their efficiency to this extent. I explain to them in the beginning that I know perfectly well that many of them have a dread of the subject, that many fear they will never be interested in it, and that they possibly do not care to do the work. But I also tell them that

no matter what their feeling is in the matter they will have to do it; that even if they practice in a small country town the time will come when they will be obliged to do something in that line to help out a patient or to assist an orthodontist living in a distant city, and we want them to be able to do it. I mention cases of private patients that I have referred to local dentists for the purpose of having them carry on my work, and they have absolutely declined to do anything in the matter; they were afraid to touch the cases. I tell them I do not want them to feel the same way, but wish them to be in position to help a patient out of any difficulty that might occur.

In these various ways I try to give our students a fundamental idea of the subject and as much practical knowledge as is possible in the time allowed. While we cannot assign a patient to every student, we can give one case to five or six students jointly, and they can all get the same instruction out of it that they would if each student had a patient for himself.

Dr. Harry E. Kelsey, Baltimore.

I am so much in accord with the views of the essayist as expressed in his concise and well-arranged paper that a long and detailed discussion of it on my part would only entail a repetition. There are, however, one or two points which may admit of a little further elaboration, and one at least on which I am rather inclined to disagree with him.

To my mind, there are necessarily two objects to be accomplished in the teaching of this subject in the dental schools. The first and most important, of course, is that the student shall receive instruction in those fundamental principles which have been so well outlined by the essayist, for, as he truly says, no amount of technical training will avail without a thorough knowledge of the principles upon which that technic is based, and I will venture to say that the subject matter of at least eight or ten lectures given by any man who holds to the now generally accepted basic principles of orthodontia will be singularly close to that suggested or outlined by the essayist. To my mind, however, these should be interspersed with hours devoted to the clinical treatment of patients, and a consideration of methods of treatment to enable the student to better understand what has been clinically presented to him. But neither clinical work, nor any consideration of methods of treatment, until normal occlusion, malocclusions and their

classification, etiology and characteristics, together with their effect upon the adjacent structures, have been thoroughly gone into, both by lecture and quiz. The later lectures should include an analysis of the most approved appliances, the operative requirements which led to their development, and the manner of their application and control in the treatment of cases—all of this to be conducted in the lecture room, or as an operative clinic before the entire class.

The other object in teaching is of much less importance to either the teacher or the student, and is concerned more with the preparation of the student for the State Board examinations which he will have to pass subsequent to his college course, and in which he is often confronted with questions regarding obsolete, unscientific and useless methods and appliances. There is no doubt, however, that instruction given along these lines may be of much benefit to the student, if properly conducted, as through it he will acquire a knowledge of the history of this subject, of which no practitioner, whether a specialist or not, should be entirely ignorant.

Now, it is with regard to the general clinic and conduct of cases in the infirmary that I am inclined to disagree somewhat with the essayist in one particular, namely, with his suggestion that the conduct of these cases be entirely in the hands of the demonstrator, for it seems to be that students in this, as in other branches of dentistry, will only acquire the necessary skill and confidence, which are essential to a later successful undertaking of cases, by being permitted to carry out to a certain extent the actual manipulative procedure involved in their treatment. And I believe if their work is carried on under the close supervision of the instructor, together with the strict requirement that they be faithful in study and attendance upon the case, no harm need result.

Though it is true that the average medical student does not perform operations during his college course, yet he is required to conduct, under direction, obstetrical and other important cases, and it is only by a close familiarity with these conditions that he could acquire either the confidence or knowledge to undertake them later upon his own responsibility, and the same applies to any kind of treatment which requires manipulative procedure. It therefore seems manifest that, as a beginner must put his hand to the work some time, it is better that he should do so at first, under the direction of an experi-

enced instructor. The two or three cases which may be used for clinical instruction in the lecture room should be, if possible, typical of the various classes of malocclusion, while those in the general clinic will provide manipulative experience to the student in the adjustment and control of appliances, no matter to what class they belong.

I do not mean to say, of course, that it is possible for every student to treat even one case, but it is possible for each to have some practice in taking impressions and fitting appliances in the mouth, together with the opportunity of either operating those or other appliances, or of observing appliances that are similar to those that they have inserted under the management of the demonstrator.

The fact that many of those men who are now specializing in orthodontia acquired their special instruction from a post-graduate course of only two or three months, in which little opportunity for the actual conduct of cases could be provided, cannot be accepted as evidence that raw students may do the same. The post-graduate student is supposed to have acquired manipulative skill and the confidence which comes from experience in handling patients during the conduct of other operations, while that is one of the most important things that the new student has to learn.

Finally, I take it, that it is the object of this society, by study, research, and a comparison of methods, and their discussion, to discover and recommend to its members what is found to be best, and in no branch is there a greater need for standardizing its teaching than in orthodontia, for, owing to the long treatment these cases are often in the hands of two or three different men before their termination, because of conditions which often arise making it necessary for patients to move from one part of the country to another during treatment.

Dr. Jas. B. Morison, Montreal.

In view of the men who precede me in the discussion of this paper, I do not feel that what I can say will be of much value or interest, it being covered and enlarged upon. However, one or two things appeal to me in the teaching of this subject, and they may warrant repetition.

The writer has suggested limiting the course of teaching of this subject in the colleges, and I must take issue with him

on that point. To me it would seem that the subject of orthodontia has such a broadening and illuminating effect on the general study of dentistry, particularly in the subjects of operative and prosthetic dentistry, that the students cannot get too much of it. The teacher should give all that he has, and the best men in the specialty should be the teachers of it in the colleges. Dr. Hawley's review of the subject as taught in lectures is very comprehensive, but I cannot see how the work can be covered and the necessary emphasis given the different phases in ten lectures. I would suggest twenty.

Orthodontia is a distinct specialty, but in teaching the principles, as the essayist has so aptly called them, we are doing a great deal towards making the student a better dentist.

In regard to the clinical work, Dr. Hawley's solution is ideal, but it will be exceedingly hard for our colleges to obtain qualified men to remain in our clinic continuously for even a year, and comparatively few men are qualified at the end of a short post-graduate course. Two or three years' experience is absolutely necessary for the teacher and clinician, as the student must feel the authority such experience gives.

In order to fulfill his duty after graduation I feel that every student should have clinical as well as laboratory training and experience. I know the failures that some students make in this work, but by allotting three or even four students to each case, and mixing the brighter with the less favored, results can be obtained and justice be done the patient. All student work must, as far as technic goes, be of a comparatively low order, and where the class is too large to be allowed to see private cases, I would suggest that the teacher of the subject conduct one case entirely himself in the clinic room, demonstrating each step as he carries it on.

We all know the inspiration we receive on seeing a beautiful piece of work along the lines we are striving, and this will serve to set the students' ideals and be a striking object lesson compared with their first attempts.

Failures can be minimized by a careful selection of patients and easier cases, and to my mind are not to be considered when compared to the great benefit the students receive, not only from doing some work, but by seeing a number of cases being treated.

I might say in closing, that for demonstrating purposes, I have found a model with the ten anterior teeth set in wax

very useful. For Class I cases these teeth are set in like position to the case or model of case to be illustrated. Appliances are adjusted and by warming the wax the teeth are carried by force exerted through the appliance to normal occlusion. These models can be placed in a Bonwill articulator for illustration of Class II and III cases. This may seem to be a rather simple procedure, but it serves to demonstrate in a definite way many details the student finds hard to absorb in a lecture, or from a drawing.

I heartily endorse Dr. Hawley's advocacy of post-graduate schools, as the association with several men of experience and the increased knowledge and interest that can be derived, is most necessary to secure a man in his allegiance to this great and growing specialty of dentistry.

Dr. R. Ottolengui, New York.

Dr. Hawley has said that he never read a paper I did not discuss, and I would not be happy if I did not discuss this one. On this occasion I regret to say that I am not a college teacher. In that respect I believe that I am fortunate, and perhaps any college in which I might teach is fortunate, too. But I conducted a course in orthodontia with a post-graduate class for three years in succession, the class being limited to 25. And I would like to say here that it seems to me Dr. Hawley's proposition that this subject be covered in ten lectures is giving rather a short time to the subject, for reasons that I will point out. Also, Dr. Hoffman has said that the teaching in his college is covered in eighteen hours.

In these courses that I gave to graduates, not students—men who are, therefore, supposed to have some knowledge—I gave twenty lectures of two hours each, so the course covered forty hours.

There are just two practical ideas that I want to leave with you. One is that our colleges should not be run with any reference to the future of these classes, but with regard only to the present. You are teaching classes composed of individuals who are just going out into the world, and they will be obliged to get into practice through the examining boards. They will not be obliged to tell these examining boards if they are going to practice orthodontia. Now, a great many men are drifting into orthodontia, not because of any particular fitness for it, not because they have endowments which

really show them to be skilled, but because they have heard that there is money in it. And, in behalf of the little patients whom these men are going to treat, I beseech you to see at least that your future graduates know enough to make it safe for these children to be placed in their hands.

One point in connection with the list of lectures I would like to speak of, and if I am mistaken Dr. Hawley will correct me. He had the retention covered in one lecture; he had the treatment in the Angle classes in three lectures. But I believe three lectures should be devoted to retention, that is, special teaching from each class, because treatment is based very largely upon the etiology of the class, the conditions which have brought about modification.

In regard to the clinical work, I must disagree with Dr. Hawley, who advocates that these men must have some practical experience. At the same time I sympathize with him in his fear for what may happen to the children. Sometimes, you know, a man outside of your special avocation may have an idea that will be useful to you, and this has occurred to me on many occasions and I am going to give it to you. It seems to me that all your graduates should understand the science of orthodontia, and perhaps those who have a special aptitude for it should be specially taught. Those men who are going to be taught the art should be placed in charge of the cases in this manner: Always under the guidance of your demonstrator or professor. I would take, then, a senior class man and give him the care of the case, and I would assign to him, as assistant, a junior class man. Now, I would exact that the junior class man should be present at every treatment, and that the senior class man should explain to him the reason of everything he does in that mouth, for two reasons: First, for the instruction of the junior class man, and, second, because there is no better way to learn a thing than to teach it. That man who is definitely giving the reason to another man for the thing he does, will find a reason in his own mind for doing it, and will not do anything in that child's mouth for which he cannot find a reason. Then when the senior is graduated the case is not completed, for you have in your next senior class a man perfectly familiar with everything which has so far been done in the case, who is acquainted with the child, and who is, therefore, perfectly competent to continue the case. And to him might be assigned, as assistant, another junior class man.

Dr. Thos. L. Gilmer, Chicago

It seems to me that there has been a little neglect on the part of the essayist, as well as those who have discussed this paper, in not calling attention to one phase of the subject which to my mind is of vital importance. What I refer to, is the method of attaching working appliances and retaining appliances, that they may not injure the teeth. That much damage to the teeth is being done by orthodontists we must all agree. In many instances it is appalling. It is rare that decay is not set up in some one or more teeth which carry bands supporting appliances. I have seen whole sets of teeth injured beyond repair. It is true that this injury is not always the fault of the orthodontist—it is frequently the patient's fault; but unless orthodontists realize the seriousness of the matter they will not impress it upon their patients sufficiently to cause them to take proper care. I hope that those who teach orthodontia will do as much as they can to offset the injury by properly instructing the students in the need of constant care of their patients.

Dr. J. G. Lane, Philadelphia

We have listened to a very delightful dissertation on orthodontia teaching. The difficulties attending the teaching of orthodontia have been presented with skill from different viewpoints, each and every method presented having its points of merit. It has been stated, also, that the teaching of orthodontia is a much more serious proposition than possibly the teaching of any other branch of dentistry. And added to this fact that it requires on the part of the student a particular skill, a particular knowledge of dynamics and a particular knowledge of many of the underlying principles which the general run of dental students may or may not possess—and no matter whether they do possess them or not—it also entails a peculiar personality, a liking for that kind of work. I believe it is not possible for a student to successfully prosecute the study of orthodontia unless he has some personal liking for that kind of thing—the dynamics or the physics, or at least some phase of it—to a degree sufficient to make the subject interesting to him.

It has been stated here that the wisest plan would be to have the instructors in charge do all the clinical work. That has its good argument, but it also has its disadvantages. I believe that the only way the technic of these operations

can be learned is for each student to get his own hands into it and execute it himself, under the guidance of an instructor. Because of the apparent necessity that a man should possess a peculiar ability and personality to make the work a success, this would, in my estimation, make it wise to eliminate the man who does not have these prerequisites. In other words, make the course elective and to a certain extent selective. We see a great deal of what one might call rough work, even brutally practiced, on the little patients in the clinic. This must to a certain extent be expected; but as for the man who is indifferent, who never expects to practice orthodontia and never will make a success of it, I think it is wise to eliminate him from that part of the college work, relieving him of the necessity of performing orthodontia operations—the same as he is not required to do actual oral surgery, or X-ray work, all of which are just as much a part of general dentistry (and even more so) than orthodontia. The course should, therefore, be made elective and selective.

Dr. Hawley's idea of giving a course of lectures on principles which could be covered in ten lectures, and so arranged as to exclude fixtures and treatment, seems to me ideal. Let the clinical and technical part be given in a later year. Then let the clinic be so employed that only suitable cases for teaching principles would be selected—not taking every case that comes in, for we know that the very vilest kind of malocclusions come into a dental college clinic. It is a mistake, I think, to try to take up every case that comes along.

As to assigning a case to the care of more than one man, I believe it loses interest for all students except the one directly in charge of it. We do not have sufficient cases to give one to each member of the class, but by making the course elective and selective there would be more than enough to go around, and we could then select the cases and get much more out of them from an educational viewpoint.

Dr. Hawley (closing the discussion) There is very little I wish to say further on the subject. In regard to extending the suggested course, I want to remind you of one sentence either just before or immediately following the proposed schedule: "At least this much should be given in every dental college." Now, if we could make the course fifty lectures it would be well, if one hundred that would be better, but I say—"At least this much

should be given." I could cover the ground a great deal better in twenty lectures, but the advisability of a more extended course depends on the colleges and how far you are going with the subject and what your curriculum is. And it is the same with the clinic.

In regard to the extent of the clinic, I am still of the opinion that if only a very small clinic could be given I would far rather the student see an appliance properly adjusted on one patient than for him to try to adjust appliances in five cases without that instruction. That, I believe, should come first. We should first have the instruction in the laboratory; then the student should see work carried out in the mouth, after which, if you have time to go on with the orthodontia clinic, letting the student do the work, well and good, remembering the problems presenting there.

I have known of instruction in orthodontia being given in schools where the course was limited to simply the construction of a few appliances without any instruction in the general principles underlying those appliances. That is wrong, for it will always result in misfortune.

The question of the character of the laboratory work, as to the constructing of appliances—our idea on this point as to whether we shall draw tubing and plate and make nuts and bolts—is based upon the matter of time limit. You cannot do everything in a college course; there are other things to do, and the student has to depend first upon general dentistry. Why should he take that time to learn to do something which he will never do afterwards? Personally, I never make those things. I can buy them cheaper and better than I can make them, and why should I teach a student to do it when he can buy all those things better and cheaper? Of course, in clinical work the student is not expected to adopt the highest technic that a specialist would use—that would be impossible, I believe. But in this clinical work the patient's interests should be borne in mind a little more than they have been in the past. Dr. Gilmer has spoken of the injuries done to teeth in many instances, and this is one of the best arguments for my idea of a clinical course such as I have outlined. It is not the man who are really studying the subject of orthodontia earnestly and devoting time to it that are having this trouble—they are not injuring teeth, they are not doing any injustice to patients. And, again considering this phase of the question, I doubt

whether the undergraduate student should do the clinical work himself. In a medical college students are not allowed to do surgical operations. They have seen them well done and they know the best technic. If it were possible to carry on the course indefinitely and go on and give the surgical courses and let the student do operations, that would be a fine thing. And so would it be a fine thing if you could give in your dental schools post-graduate orthodontia. But my argument is based on the fact that there is a time limit, and also on the belief that we should give a course in the vital principles that have been adopted by the men who are devoting their lives to this work and have probably reached the most careful conclusions.

TEACHING CLINICAL DENTAL PATHOLOGY.

DR. A. E. WEBSTER, TORONTO, CANADA.

The next great advance in dentistry will be in pathology. The time is ripe. Attention is being focused from many angles upon the hundred and one unexplained diseases of the teeth and mouth.

We have boasted of our mechanical skill so long that the public judge our dental education by the shine we put on gold crowns. It is high time we teach our students and the public that our advice is of equal, if not greater, value than our mechanical skill. The oral hygiene movement has done much for the advancement of true dentistry. Few dental schools on this continent have even followed, not to mention lead, in this.

General Clinic.

Clinical dental pathology should be taught as a part of the didactic course, and should extend over the same period of time and be illustrative of it. Such cases as illustrate the lectures should be selected from the examining room and brought before the students in clinics.

Patients should be received, advised and treated in the same manner in a dental hospital as in a general hospital. Students should be present and assist in this work. Such a clinic should be conducted by the teachers of the largest experience. A man whose opinions as to the reasons for general diseases being caused from the mouth, and mouth disease being caused from general diseases, is of the greatest value. A few well-selected cases discussed and advised upon are of much greater value than a score of mechanical operations per-

formed for patients without an understanding of the underlying principles involved.

There ought to be developed in connection with every dental school a clinic, where patients could receive advice upon anything and everything pertaining to the condition and diseases of their mouths, and the effect of an uncared-for mouth on the general health. It should not be necessary that all patients receiving advice at such a clinic should be treated in the infirmary of the college. Such a clinic should be held at a definite hour, once or twice a week, or daily if need be. Cases of special interest should be referred to this clinic from the general examining room.

On each clinic day two to four students should present a patient and give a complete report of their findings and their advice. They should have at least an hour or more to examine and study the case before presenting it. The library, X-ray room and pathological laboratory should be available to such students in preparing their cases. The clinician should have previously examined the cases presented by the students. The students should be assisted, corrected, questioned and advised in every possible detail bearing on the case they present. Such a method of examination and study of cases would teach the students and patients that there are real problems in dentistry worthy of study, and that the library, museum, X-ray room and laboratories are all necessary adjuncts in their solution. At such a clinic students should be questioned on the anatomy, physiology, chemistry and histology, as well as the pathology, of the cases presented, and thus show value of a knowledge of these subjects in the practice of dentistry.

The clinician should examine and present a few cases himself at each clinic to illustrate how he arrives at conclusions. Cases which had been previously examined and sent on for treatment should be again presented before the clinic when completed or during treatment.

Such a clinic properly conducted would become so attractive to students that there would be no question of attendance.

Chairside Clinic in the Infirmary.

While the general clinic is of great value to bring before all the students a great variety of cases, and especially rare ones, it is at the chairside that students must be taught how to observe and learn the facts of dental pathology. The

severest charge at the door of the dental profession today is the lack of an appreciation of the significance of the many changing and diversified manifestations of disorders in the human mouth. There is no classification of the many forms of gingivitis, pyorrhea or pulpitis. By the chair, with only a few present, is the best place to study these questions. A clinician could go from chair to chair telling students what to do and what not to do, and could thereby lay no more claim to being an educator than a boss of a bunch of navies. No demonstrator can teach what he doesn't know himself, and very few can teach half what they do know. The demonstrators should be prepared on all subjects or know where the information may be found.

A patient has pain from a tooth. It is a poor method of teaching to tell a student to heat some gutta percha and touch it to a tooth to see if it is alive. Far better to ask the student for all the causes of pain in or about a tooth. Then by a process of exclusion arrive at the one which is most likely the cause of this pain. This will involve testing the teeth for the vitality of the pulps. Ask the student for all the methods for making such a test, and by a similar manner of exclusion select the most suitable method. By the improper method mentioned the student learns one stunt; by the latter, he reviews his text-books and lectures, and learns a proper basis upon which to arrive at a conclusion and has an exercise in reasoning from what he already knows.

A tumor is found opposite the end of the root of the upper lateral incisor. It would be a poor method of teaching to tell the student to drill through the lingual surface of the crown to the pulp chamber and put some creosote into the cavity and seal it with cement. What a lesson could be taught in bacteriology, pathology, dental anatomy, histology and therapeutics from such a case! What are tumors? Classify them. What are the chief characteristics of each? What are the subjective and objective symptoms in this one? To which class of tumors do the symptoms point? What would be the pathological findings if your diagnosis is correct? What would be the treatment? These questions illustrate only one direction which questions might take. When such a case is found in the infirmary it is well to gather the students nearby for a few minutes to see and hear and be quizzed. If the patient is not suffering pain and the student shows a profound

ignorance of the case, the patient should be dismissed and the student informed of the presence of the library in the college and text-books of his own. The student should be quizzed carefully over this subject before he again proceeds with the treatment.

If the demonstrator has gone carefully over the pathology of a case with a student, or directed him to look up the museum, library, X-ray room or pathological laboratory to assist him, he must see to it that his instructions are carried out, and to insure this, other demonstrators, before whom the case might be presented, must be informed of what he has directed the student to do. Cases must be followed by demonstrators so that they can show the student the verification of their teachings.

The dental library and the text-books ought to be the companion and refuge of the clinician. Generally, clinicians are so busy going from chair to chair that they have little time to think. But if the habit were followed of referring constantly to the literature of the subjects taught much time could be saved. Students should be encouraged to study each case carefully rather than ask the clinician for everything. They can always have books as companions, but not teachers, and if they do not learn how to use their library at college they go out helpless, indeed. The same use of the library and text-books should be encouraged in the general clinic. In fact, it is a good idea for the clinicians to look up doubtful subjects in the texts in the presence of the students, so as to show them what books are for and how to use them. A set of the text-books used in the different departments might well be placed in the infirmary office for reference.

The X-ray is so valuable an assistance in diagnosis and study of dental pathology that modern dentistry demands its use. Students should be taught how to read both the negative and the positive. They should see enough radiographs to become familiar with shadows of normal and pathological tissues.

A well-equipped dental museum should contain specimens of a large number of the ordinary diseases, defects and deformities found about the mouth. Clinicians should be familiar with the specimens in the museum and direct students to them for study and comparison with those seen in the clinic.

The pathological laboratory is an essential part of a dental clinic. All kinds of pathological specimens should be sent to the laboratory for examination. Students should be required to take their own specimens from patients and carry on the examination in the laboratory, and afterwards report to the clinic. It is hardly necessary to point out the value of this, both to the clinician and the student. It is a remarkable thing how an infirmary clinic can run for months and not find a case in which the pathological laboratory would be of any assistance in making a diagnosis. The fact of the matter is, there is more clinical material going to waste about every dental college than there is used. Judging from what they do, some students leave our halls believing that extracting teeth and making dentures is dentistry. Others that making crowns and bridges is dentistry. Others, again, believe that filling teeth is dentistry. A few believe that treating and preventing dental caries is dentistry, and still fewer believe that advising and directing the public in how to care for their mouths as a means of maintaining bodily health and strength is practicing dentistry—while, as a matter of fact, all of these, and more, is practicing dentistry. Students get their views of dentistry from what is practiced in the infirmary, and not from what is said in the lecture hall. If dental pathology is not taught clinically, the student does not learn it. The clinician is the most important teacher in a dental college, and by the same token the one of least experience and the recipient of the smallest salary.

The professor of dental pathology who does not conduct a clinic or see the cases in the infirmary is surely crying in a wilderness.

Minor Surgery Clinic.

The minor surgery clinic is, perhaps, the one place where almost every case treated has a definite pathological history which ought to be studied.

In the course of one term any good dental infirmary clinic will provide illustrations of almost all the pathological conditions found in general practice, especially if a clinic is established for this purpose. The great difficulty is to get the student to see, study and appreciate many of the cases.

To make the subject more concrete, I append the following list of subjects as capable of being illustrated and taught in the general clinic and at the chairside:

What Can Be Taught Clinically.

Examination of patients.

Dentition—Eruption, development, absorption, and loss of temporary teeth.

Physiology and Pathological—Defects and abnormalities.

Permanent Teeth—Eruption, calcification, defects, anomalies, deformities, irregularities, malocclusion, supernumeraries, lack of development of the jaws and teeth.

Dental Caries—Erosions, abrasions.

Consequence of Each—Pulpitis, pericementitis, dento alveolar abscess, osteomyelitis, cellulitis.

Fractures of the teeth, process, jaws.

Soft Parts of the Mouth—Acute infections, chronic infections, syphilis, gonorrhea, tuberculosis.

New Growths—Sarcoma, carcinoma.

Cysts.

Pregnancy—Effects on teeth and soft parts. Results of good and bad dentistry. Mastication and diet. Systemic affections manifested in the mouth. Mouth conditions cause of systemic affections. Saliva and mucous.

DISCUSSION.

Dr. A. D. Black, Chicago.

I was particularly pleased to see upon the program a paper bearing this title, because it has seemed to me that there has always existed an unduly wide chasm between our knowledge of pathology and our application of treatment in dentistry. This is doubtless due to the fact that treatment in dentistry was applied before pathology was systematically studied.

This paper seems, in one way, to be broader than its title, in that it has covered nearly the whole field of dentistry. But viewing the subject from another standpoint, it is not, because in the broadest sense we have no treatment except that which is applied on the basis of our knowledge of pathology. I can find little in the paper with which I do not agree, and I prefer, therefore, to add a few ideas along similar lines, rather than to criticize it.

In my own mind, it is impossible to separate the idea of pathology from the idea of study. That we need better instruction in clinical pathology is fully realized. We need to develop better habits of study on the part of our students as a basis for this clinical instruction. It is with that idea in mind that we have in the institution with which I am connected been gradually changing our curriculum by putting into the freshman class more of those subjects which require study outside the school. For example, during the past year, we have changed the arrangement of the curriculum as regards the subject of general anatomy, putting it all into the freshman year. We do not contend that students would learn anatomy better by having it all in one year, perhaps not as well as they would by having it in two years. But the idea is that of placing before the freshman students a schedule which would require a great deal of study if they got through the freshman year at all, in order that we might develop the habit of study, and with the expectation that those men who do not acquire the habit of study would not be with us after the freshman year. We feel that we must develop better habits of study among the students, because the teaching of clinical pathology alone, without the knowledge of general and special dental pathology as taught in the lecture room and from the text-books, cannot be satisfactory.

To go back a little: I think the first thing that should be done in arranging our course for the teaching of clinical pathology should be a thorough presentation of the normal tissues in anatomy, physiology and histology. And then, along with general histology, a parallel course in general pathology should be given in order that the students may get a fair comparison of the normal with the pathological conditions. This to be followed in the next year with parallel courses in special histology, dental histology and dental pathology, as a basis for the real teaching of clinical pathology.

As an adjunct to this work, the greatest possible use should be made of our dental libraries. For a number of years we have endeavored to prepare, in connection with several departments in the school, courses selected from books and dental journal articles in the dental library. The teacher of dental pathology, for example, will assign to the class the reading of certain articles in dental journals, all on a selected subject, and will announce a time when he will give a quiz on

those articles, some of which may be entirely contrary to his personal views; or a written quiz may be given on certain articles. A sufficient time is allowed so that the members of the class will have had opportunity to read the articles assigned.

It seems to me that the use of the library should not be made a part of the teaching of clinical pathology, as suggested in the paper. It should be a basis for it. It does not seem practical (and the same is true of several other similar suggestions) to utilize the library in immediate connection with the treatment of a case that is in the chair at the particular moment.

We can do a great deal of good work in the teaching of pathology by having a museum that is conveniently arranged and with the specimens well classified. The ideal way of using such a museum would be for the person in charge of the museum, or better perhaps the teacher in a particular department, to have assigned to him at certain hours groups of students for the purpose of studying the specimens. By this plan a great deal of very interesting and profitable work could be done.

The value of the X-ray in this work can hardly be overestimated. Each school should be well equipped with an X-ray outfit and an operator who will be in attendance during certain hours of every day in order that cases which require the use of the X-ray may have that service. We not only make use of the X-ray for diagnostic purposes, but make rather extensive use of it in other ways. For example, we are, at the expense of the school, asking our students to take many (not all) cases of pyorrhea which present to the X-ray operator, to have radiographs made of the various parts of the mouth to show the extent to which the alveolar process has been destroyed and to study the conditions. We are doing the same thing with the children that come in, having radiographs made of the permanent teeth, showing the development of the roots. Also, we are this year, for the first time, using the X-ray in connection with the study of the technic of filling root-canals. It might be of interest to mention this: We are requiring each member of the senior class to take one or two cases in which he has filled the root-canals into the X-ray room and have radiograps made. This is done under the supervision of one of the demonstrators, who does not tell the student beforehand that a

particular case is to go to the X-ray room. In this way we are trying to keep all our senior students a little on the qui vive as to his root-filling operations, because we recognize that the demonstrator cannot at all judge how well a root-filling is put in. We have told our senior class that next year we purpose to bring those radiographs to this Institute and show them to you. Whether we are going to be so very proud of them I do not know.

Dr. J. B. Willmott: You will bring them all, I suppose?

Dr. Black: We will bring them all. I want to say, however, that if you gentlemen make too severe criticism of those radiographs when we bring them here, we are going to ask you all to submit to the same test the following year. But speaking seriously, I think it is doing a great deal to improve the root-fillings that are being placed by the students.

In the clinical teaching of dental pathology, we have a field of work in which none of us do as well as we should, because of the conditions mentioned in this paper. This work takes lots of time, and to be done right it should be done by the heads of the particular departments. We cannot rely on demonstrators who are only two or three years out of college to do this work as it should be done. If any plan can be developed whereby the teaching at the chair in the clinic can be improved, I am sure this would improve the work of every school in this country, because I believe we are all lame in the matter of personal demonstration at the chair, no matter what particular plan a certain school may employ.

I do not want to pass this discussion without referring to the minor surgical clinic which in our school is conducted by Dr. Gilmer. For many years we have followed a very definite course of instruction in the handling of these cases. Our clinic occupies all the time of the school on Friday mornings. We have regular printed suggestive history sheets and require our students to write out as complete a history as may be of each case which presents, the student being assisted by one of the instructors. The student also writes up the operation, which he is permitted to view at close range, and he is entrusted with the after treatment, recording what is done at each visit. These history sheets are turned in and properly filed. During the year we give prizes to the two students who write the best case histories. This one department of work in our school has been developed almost to perfection, I believe,

and I am sure that the students who follow these cases through get a great deal out of them.

In all the work of clinical teaching there is one other phase to which I feel we have not attached as much importance as we should, and that is the development of team work on the part of the demonstrators and faculty members in methods of teaching the various branches which present in the clinic. I have no doubt that a great many times discrepancies occur between the presentation of a subject by the professor in the lecture room and the demonstrations given by the men in charge of the clinic. It is a matter that requires the constant attention of the head of each department and also the frequent coming together of those interested in the teaching of a particular subject.

As a matter of developing team work, I want to make one statement regarding our present plan for handling the treatment of the dental pulp. In connection with this subject we have had, during the past few months, two or three meetings which have been attended by every teacher and demonstrator who is in any way interested in or brought into contact with the teaching of this subject, and I give it simply as illustrative of a plan which might be applied to the teaching of any branch. There was presented at the first meeting an outline of that which was considered to be a proper, brief statement of the various conditions which present and the treatment which should be employed in those cases. There were present some twenty men, including the demonstrators, and each man was asked to express his opinion on these various conditions. Following that, we printed this little book, which gives in very brief detail an outline for the consideration and treatment of those conditions. This was done, not so much to develop and to place this outline in the hands of those who are teaching that subject, as to interest the men and to impress upon them this idea above all others: Here are twenty men, and here is an outline which we have made up according to the suggestions of these men. There probably is not a single man in those twenty who would in his practice exactly follow every detail of this outline; but here in this school we want every man to stand behind this outline. No matter whether he would follow it in his practice or not, here is a **system** of doing something, and we try to impress upon them the importance of doing it in that way in the school for the cumulative effect it will have on

the students. Just in proportion as you can get the men together and apply this sort of team work in teaching will the effectiveness of your teaching along this line be increased.

Dr. C. J. Grieves, Baltimore.

I wish first to express my pleasure in reading and discussing this excellent and practical essay of Dr. Webster's. With the most of his conclusions I am in hearty accord, and if there be a variance, it is by way of emphasis on, rather than in differing from, the subject matter of the paper.

I am glad the essayist has not restricted the field of his observations in the paper to its title, "Clinical Dental Pathology." While there exists such a pathology, dealing with disease of the dental tissues proper, the title is not sufficiently broad. There is not a practitioner of dentistry today, worthy the degree, who limits his practice or his findings to the dental tissues proper. We could, with just as good reason, classify alveolar pathology, gingival pathology, mucosal pathology, salivary pathology, etc. There can exist no such thing as a dental pathology, independent of pathology of the whole body in its deductions and conclusions, any more than the five cardinal dental tissues, this specialization teaches, can exist outside of the body and mouth environment. Oral diseases are almost entirely environmental with the constitutional defect as a primary etiologic cause. The failure to grasp this fact is the reason why we are accused of lacking a "pathological sense," and we are all more or less oral pathologists, though we may not admit it. It is pleasing to hear the essayist, in discussing the chief of the clinic, say, "Such a clinic should be conducted by a teacher of the largest experience." "A man whose opinions as to the reasons for general disease being caused from the mouth, and mouth disease being caused from general diseases, would be of the greatest value."

Confirming this broad idea, and very pertinent is the suggestion, not only to the teacher and student body, but to the present-day practitioner in his office, when he again remarks, "Patients should be received, advised and treated in the same manner in the dental hospital as in the general hospital." This implies very full history cards, not only of the strictly dental, as number and types of filling, pulps and abscesses treated, bridges and dentures made, but of gingival,

salivary, calculary, etc., pharyngeal and nasal and aural conditions, and also the strictly medical findings as to the general health. The latter cannot always be obtained in direct question by the dentist, as in a dental infirmary connected with a hospital; but a graduate trained as Dr. Webster suggests would "get the habit" and obtain any necessary history from the family medical attendant. Even now, the dentist hastens to get all data as to the constitutional state, presumably for self-protection, in syphilis, tuberculosis and pregnancy, of which he knows the dangers. Why should he not pursue the practice by record in other diseases and protect the patient as well as himself?

It is also evident that the method of clinical teaching proposed in this paper will produce a type of practitioner who will at least be able to read and interpret the report of his medical confrere just a little better than the present type. He would then be quite as much concerned by a history of an old endocarditis, a rheumatoid arthritis, or a diabetes as by a positive Wasserman.

The greatest need, an urgent public need, today, both in medicine and dentistry, is for the pathologist trained to both oral and general pathology. I know of two hospitals which have taken dental graduates and are making their own oral pathologists. They are really doing our work over again. There are opportunities all over this country in hospitals for the men who can interpret the oral septic conditions which produce body damage, and there will be many more created. The most difficult part in carrying out the program of the Research Commission of The National Dental Association was to find pathological and bacteriological technicians, trained in mouth work, to assist the director of the research. The commission found many universities anxious to open their hospitals, laboratories and animal houses to its directors, that the study of related oral diseases might be made first in their institutions. In one a special professorship of oral sepsis was created; another is granting the Ph. D. degree, the first on record on mouth research alone. If the dental schools do not produce oral pathologists in this the broadest sense of the word, we are thus shown that there are other means by which they can be made. I believe that students clinically educated as the essayist has indicated, compelled to use the reference library, X-ray room, pathological and bacteriological labora-

tories in the study of his patient's history, as associated with mouth disease, will soon find on the history cards all the diseases which were classed as special pathology in my paper read before you last year, and find them having some definite practical bearing on dentistry. I am also very sure that these men, as graduates, will ably fill the hospital positions mentioned; that they will be better educated than the most of us, and that they will never put dentistry to shame.

If so many hospitals have gone to such an expenditure of time and money and crowded their laboratories to study this clinical oral pathological material as related to general disease, they must consider it of great value; and this is the same clinical material which is daily wasted in the examining room of the average dental school. It will do no good to say that many of these problems might have been solved long ago, and many lives saved thereby. It will do a lot of good to adopt immediately Dr. Webster's suggestion—i. e., that the examining room is the great pathological clearing house, where enough material is to be had of vital interest to keep the pathological laboratory busy and to grow all over the walls and out the windows in the bacteriological laboratory. With the student body at work on specimens from actual cases, these rooms would not present their usual deserted appearance, and much research could be accomplished.

The most important point in this paper is the personnel of that group of teachers classed as clinical instructors and demonstrators who man the examining room. My paper last year consisted largely of a plea for the separation of pathology, as a chair, from all other branches, particularly operative dentistry. I am still of the same mind, only more so, especially in regard to the teaching of clinical pathology. It should be divorced absolutely from operative procedure in the clinic room and infirmary; for when we attempt to combine the two, the student cannot grasp both, and will select the technical, because it is tangible and easy compared to pathology, which is abstruse and not so perceptible. The technic of the most intricate surgical operation is simple and easy to learn compared to the study of the tissue changes and microbic invasion which prompted that operation. The student naturally turns to the easiest lesson when he has the choice of two; not so when his attention is fixed on but one. With these facts in mind the operative demonstrators should have nothing to

do with the pathology in the case, only in so far as it affects the results or technic of his operation. There should be one clinical instructor at least of the group, whose sole thought must be the teaching of clinical pathology, along the lines laid down in the paper. If his opinions conflict with those of the operative demonstrator all the better for the students who hear the discussion; they then surely will never forget it. Allow me to quote again: "Students get their views of dentistry from what is practiced in the infirmary and not from what is said in the lecture hall." "If dental pathology is not taught clinically, the student does not learn it." "The clinician is the most important teacher in the dental college, and by the same token the one of least experience and the recipient of the smallest salary." Never were truer words spoken.

Finally the essayist brings up the whole question of the type of man in the examining room and of demonstrations generally with the pithy remark: "No demonstrator can teach what he does not know himself, and very few can teach half what they do know."

How then shall this problem of the subordinate teachers in all lines be solved?

There can, in my opinion, be but one answer to this question, and it does not necessarily involve any increase in salary, however desirable that may be. It lies in the atmosphere and the practice growing out of such, centuries old, that pertains in all great European universities, where there exists a student caste of subordinates, fellows, graduates and under-graduate bodies. The personality of the professor and his teachings overshadows the mere glamour of attending such a university. A student from abroad is proud to have sat at the feet of a great master. He speaks, for instance, of having taken his histology under Stohr, his pathology under Muir, or his physiology under Starling, and he forgets for the moment the university in his admiration for the master. This of necessity implies a great number of advanced graduate students or fellows who reflect the professor's ideas. But in a small way, such should be the status of our demonstrators. They really hold fellowships and, while they teach the under-graduate body, they are in turn, or should be, taught by the professor above them. In fact, you will find this, and not the small salary, their only object in demonstrating. So the head of every great department should assemble and impart his enthu-

siasm to his demonstrators and clinical instructors, and teach them that they may teach the student body. Most important of all, the man presiding in the examining room should have his every thought and "hobby," so that clinical material may be abundant. This is the true esprit du corps and university spirit which money cannot buy; it arises from the enthusiasm of the teacher. It may be objected that this will produce a narrow-guage graduate, and the answer is not from a broad-guage professor. Better learn one good man's ideas thoroughly than to scatter mentally by trying to absorb those of many and be sure of nothing.

This discussion could go on interminably, there are so many points to discuss. Without appearing fulsome in praise, I like the tone of the whole paper—the reference use of the museum and library, the reading of skiagraphs, the quiz at the chair, the studying and writing up of cases and the presentation of such by the student to the class; and the only point on which I do not entirely agree is, that I do wish the essayist had made his course as broad clinically as I had mine for the full chair in last year's paper.

Dr. H. E. Friesell, Pittsburgh.

We have heard an excellent paper, but we have grown to look for nothing else from Dr. Webster. He has given us a very full outline as to what we should do in the teaching of clinical dental pathology, the reasons therefor, etc., and the discussors who have preceded me have pretty well covered and elaborated the subject as laid down by the essayist. I shall, therefore, as far as possible, confine my remarks to what we aim to do along this line in the University of Pittsburgh.

To carry out in detail all of the suggestions as laid down by the essayist would require practically individual instruction in dental pathology instead of class instruction, which is necessary under existing conditions. Individual instruction is out of the question in the case of the average school unless we have the four-year dental course.

The faculty of the University of Pittsburgh Dental School has had this subject under serious consideration for a number of years, and we have, as far as as been possible, put it into service. Every patient that comes into the infirmary goes to the examining room, where thorough examination of the mouth

is made by a capable examiner. If the patient comes in at an hour when the examiner is not there, a temporary examination is made, one operation is done, and the patient is referred back to the examining room at the proper hour, when a competent and thorough examination is made. Whenever there is discovered in the mouth anything out of the ordinary line the patient is referred to the head of the department to which that particular deviation from the normal would require that patient to be sent. A card is made out by the examiner calling the attention of the head of the special department to the case, this card being filed in that particular teacher's mail-box. When the teacher comes to the school he examines the card, gets in touch with the student, arranges an appointment to see the patient personally, when he makes the examination, points out the conditions that exist, and, if desirable, uses that patient for a personal demonstration in one of the several private clinic rooms. For instance, Dr. Hertig supervises special clinics on the pathological conditions or diseases of the hard tissues of the teeth. Cases relating to diseases of the pulp, requiring X-ray examination, or special treatment, are referred to Dr. Biddle. Cases that have to do especially with what we might term oral hygiene or diseases of the peridental membrane, particularly those beginning at the gingival border, are referred to Dr. Fickes, oral surgery cases to Dr. McCurdy, and special prosthetic conditions to Dr. Haslett. In every case all procedures are checked up from the time examination is made in the examining room until the case is reported back, and much benefit from the individual instruction is thereby obtained.

In addition to this we have what we call a defective or psychological clinic, in connection with which we receive many pupils from the psychological department of the public schools, and those cases are treated by two or three members of the faculty who look after them specially. Students in sections are brought in, examination made, a full report is written out in the presence of the students, and this report is referred back to the Board of Health, as well as a record kept in the college files. Aside from this, written reports of cases of defective children and those coming under the psychological department have not been made as recommended by the essayist, simply because so far we have not been able to perfect our system to that point; we have been unable to give the necessary time to writing up and studying the conditions as we would like.

One of the speakers has called attention to the necessity for development of team work on the part of the faculty. We found this necessary several years ago, and we got around it very nicely in the following manner: One night each week the members of the faculty met at 6 o'clock, had dinner, and then from 7 o'clock until midnight as a rule, and sometimes later, a discussion of all these practical conditions that arise in the clinic was entered into. Each teacher would give his views on the subject, and he had to be prepared to defend them; and from the head of the department down to the youngest demonstrator present opinions were given and discussed pro and con, after which the faculty voted upon the proper course to pursue in each instance, either in individual cases or in special cases.

In regard to library and museum, it takes a long time to build up a library, and still, longer to build up a museum. I am gratified to find that some ideas which I had thought were peculiar to myself are also attractive to some of my confreres in the Institute. I began some twenty years ago to build up a library and museum. I remember that on one occasion my statement was somewhat doubted by Dr. W. E. Willmott when I spoke of having several bushels of teeth to do certain work with. But I not only had them, but was able to supply Dr. Williams with a barrel of teeth when he wished to have some to work with. We believe there is as much to learn from the tooth that has been given up by the dentist and extracted as from the one he is able to save, and sometimes more. If the physician can learn something from post-mortem examination, certainly the dentist should be able to learn something from post-mortem examination in his special field.

We have not been able to make as great progress with our library and museum as we would like. It is a slow process. A museum is not of great value unless we have it properly and carefully classified, and until recently we have not been in position to start upon that work. I am glad to say, however, that at last we have been able to add a librarian and curator of the museum to our faculty, one of the younger men who is interested in that work and whom we have brought here to inspect the excellent library and museum established in the University of Buffalo.

One difficulty with our library is that we do not have an index. That is something this Institute has been figuring on

for several years and has not as yet perfected. A dental library containing thousands of books and journals is not of much value for reference work without an up-to-date index. [In reply to an interruption: The trouble is not with Dr. Black; it is with you fellows who have not come up with your $25 so we can put this thing into operation.]

I have tried to outline rather briefly what we have been attempting to do along the line that has been illustrated by Dr. Webster in his paper. That is as near as we have come to the ideal conditions. If we had a four years' course and an opportunity for individual instruction, I am quite sure that we could get a little bit nearer the ideal in teaching clinical dental pathology, and I sincerely hope the time will soon come when we shall be enabled to do so.

Dr. L. M. Waugh, Buffalo.

I have really very little to offer, Mr. President, in addition to what I have said in discussing papers on special pathology at the previous two meetings of the Institute. I can agree with almost everything advocated in the paper and have enjoyed it very much, but shall not take the time for reiteration, great as is the temptation when thoughts coincide. In discussing Dr. Grieve's excellent paper at our last meeting I outlined the course as we purposed teaching it. In addition, I can say at this time that the value of a library of slides referred to at that time for microscopic study, covering as much of the morbid changes as take place in the structures of the mouth, is becoming more and more recognized. You will see such a collection of the normal tissues on your visit to the University of Buffalo tomorrow. It is hoped that in a similar way a collection of pathological specimens may gradually be prepared for microscopic study and sketching by the student. It will be a long, slow task, but the result will justify the effort, as it is imperative that the dental student learn vastly more than in the past of the morbid changes occurring about the human mouth.

This, in addition to clinical instruction as advocated in the paper, should go a long way towards giving him a fairly broad reasoning power in pathologic conditions of the mouth and contiguous parts.

Dr. A. G. Friedrichs, New Orleans. This is a matter with which I am heartily in accord, and I am glad it has been brought forward in so good a way by Dr. Webster. I hold the chair of clinical dentistry, and that has been the plan I have pursued ever since I have had any connection with the school of dentistry. I have always felt that the best way to teach was at the chairside. So far, we have not been able to elaborate the method as much as we would like, but I take charge of the clinic, and all the cases that excite any comment at all or are unusual in any way, or are perhaps simply desirable for the purpose of carrying out my teachings, are brought forward and the conditions present thoroughly discussed. Some cases of more general interest I bring into the amphitheater and discuss them there. But every individual case of special interest is taken up and treated in that way.

I am certainly glad to see this apparent change of opinion. It is a method of which I have always approved, and I cannot conceive how this subject could possibly be taught in any other way. The mere didactic lecture alone serves but a poor purpose; the clinical demonstration is the best way in which this matter could be taught. I offer my hearty endorsement and approval of the paper.

Dr. A. W. Thornton, Montreal. When I looked over the program I said to myself that, in my opinion at least, this subject was the most important that would be presented at this meeting. With all due deference to other subjects and other essayists, I want to commend the paper which has been written by a man who, to my knowledge, has done such patient and progressive work along the line of the subject which he has so ably presented. I do not believe that among all the teachers on this continent there is a man that lives up to his own ideals any more conscientiously than does Dr. Webster in the work he has been doing with his students.

There are just two phases of the subject I want to touch upon. One is the use of the text-book in connection with the work in the infirmary. I think it would be a great thing for the students going through dental colleges, if the teachers would refer them to some particular book and particular chapter. This would not only help the student in his everyday work, but would serve to impress him with the idea that

the man who is teaching him is himself a student, and nothing will give a student a higher conception of his profession and a better impression of the attainments of his teacher.

The other phase of the subject to which I wish to call your attention is the difference that exists between a dental clinic and a hospital, as we understand that word in general. It is hard to have a dental clinic conducted as the other parts of a hospital are conducted. There is a great deal of "horse play;" there is a great deal of useless wandering around from chair to chair, and there is a great deal of visiting going on in all our clinics. In the institution with which I am connected at the present time the dental clinic is an integral part of the hospital, and I have been impressed with the difference in the conduct of the dental students and the conduct of the people in the other parts of the hospital. I think it should be the aim of every man connected with a dental college infirmary to conform, as far as possible, to the discipline and general order observed in the other parts of the hospital.

Dr. Alfred R. Starr, New York City.

My purpose in rising is not to discuss the paper, although I am very much interested in the subject. I simply wish to make a suggestion. Inasmuch as so much has been said here today in regard to standardization of, or co-ordination in dental education, I think it would be a very good idea if Dr. Black will furnish to the Institute a copy of the pamphlet he spoke of. I think it might be advantageous to every member of the association if that could be incorporated in this report. If in order I would make that suggestion a motion.

Dr. G. F. Roberts, Buffalo.

I would like to make a suggestion, that possibly the best way to get the students interested in pathological conditions of the mouth would be to start a "pathological journal club," giving the senior students an opportunity, when they have an interesting case in the infirmary, to go to the bacteriological laboratory and study up the case. Then, once or twice a month, have the students meet in the evening in an informal manner for the purpose of discussing the pathological condition. And not only that, but when an article on the subject appears in one of the dental journals one or two students can be assigned to study the article and report their conclusions. In that way we could get

a lot of valuable clinical material together. Most interesting cases are coming to every dentist, and the clinical and bacteriological findings in a number of similar cases might throw more light upon, for instance, decay of the teeth, if the conditions were investigated and properly followed up in a journal club.

Dr. H. T. Smith, Cincinnati.

I notice one phase of the subject that has not been presented. It is this: For some time, as must have been noticed by the teachers of special dental pathology, many of the State Board examinations have not included sufficient questions in dental pathology, the examinations being given under the subject of general pathology. It is somewhat discouraging to the teacher of dental pathology to find that the most important subjects of his course are more or less ignored. The greater percentage should be on the side of special pathology rather than on that of general pathology. The attention of the State Boards might with advantage be called to this point.

Dr. Webster (closing the discussion)

I wish to thank those who have taken part in the discussion for the kind remarks made and for the amplification of the subject. I was glad to hear Dr. Black present his views as he did. However, Dr. Grieves covered that part of the subject in the paper which he presented last year, and, consequently, I did not include it in my paper.

Dr. Black objects to students using the library in connection with clinical pathology; that subject, in his opinion, should have been prepared before. Quite true. But the student has forgotten, or was not at the lectures, or did not hear the quiz. The demonstrator knows the student should know what he has been asking about; then the best way for him to learn it is now—not tomorrow, but now.

The team work suggested and advocated by Dr. Black and Dr. Friesell is carried out in nearly every institution in some form or another. The plan outlined by Dr. Black is very excellent.

I am not quite in accord with the suggestion of Dr. Grieves that the chair of dental pathology should be absolutely separate from the chair of the practice of dentistry or operative dentistry, because if pathology is taught as a separate subject, and only didactically, there is a loss of interest in treatment;

if, for instance, a case is examined in the infirmary and a student is taken through the pathology, and then say, "Get the other man and he will teach the treatment." It would be just as well if the treatment were given at that time, when the student would still be interested.

THE TEACHING OF ORAL SURGERY.

DR. CHALMERS J. LYONS, ANN ARBOR, MICH.

I have been asked by your Program Committee to present a paper that will form the basis of discussion on what we consider the best method of teaching oral surgery in our dental colleges today.

This subject has been ably and forcefully presented a number of times before this body by some of our best teachers in the country. In the majority of papers presented the methods of teaching have differed, perhaps, only as the conditions have varied, yet in every paper some new points have been brought out that have been put into practical application and have aided many a teacher in this subject in making a better and more valuable course for his respective college. So, if in my presentation of the subject, or in the discussions which follow, some good may be found which will make the course in oral surgery of more interest and valuable to our students, then will I feel that my efforts will not have been wholly in vain.

In every educational process there are four paramount factors that enter therein. These four factors shall be mentioned, according to the opinion of the writer, in the order of their importance:

First. The object;
Second. The student;
Third. The teacher;
Fourth. The method.

Then, in discussing the teaching of oral surgery in our dental colleges, let us consider these factors in the order named. First, the object of teaching oral surgery will be discussed, then the student, then the teacher, and lastly the method of teaching oral surgery.

Instruction of any kind embraces the reception by the student as well as presentation by the teacher. Any scheme of teaching which does not have for its object the ultimate

result of instilling in the mind of the student a clear and definite knowledge of the subject is a failure.

What is the primary object in teaching oral surgery in our dental colleges?

The writer believes that the primary object of all of our instruction in the dental college should be to create a desire on the part of the student to become a thorough, painstaking and proficient dentist. The concerted aim of all departments should be to make the student the broadest possible professional man in dentistry.

The writer does not believe it is within the province of the dental college to make oral surgeons out of the students any more than it is within the province of the medical college to make opthamologists, rhinologists or pedatricians out of the graduates of the medical schools. This can only be accomplished by advanced study. The medical colleges today are not attempting to make general surgeons out of their graduates, but medical science insists that the young man who becomes proficient in general surgery must have a thorough hospital training covering a long period of time after receiving his medical degree. This kind of a preparation, together with an experience of several years in the general practice of medicine, is necessary to qualify the medical practitioner in general surgery. This thorough training should differ but little with the oral surgeon, if he expects to succeed. He must have a much broader preparation than it is possible to obtain in the dental colleges today. In the writer's opinion, then, it is only the duty of the dental colleges, in teaching oral surgery, to make out of their students broad dentists, who will have such knowledge of the subject as will enable them to diagnose pathological conditions and to intelligently instruct their patients as to the best course to pursue, thus rendering to their patients the very best possible service.

In other words, the writer believes that the mission of this course has been accomplished when the instruction has been so successfully presented that broad diagnosticians in this branch have resulted.

In view of some of the papers which have preceded this one on the subject of oral surgery, this may seem to be a pretty broad stand to take, but, as I shall attempt to point out through the paper, the average dental student is not prepared in the time that is allotted to him to take up and com-

prehend the principles of surgery in their broadest sense, which is necessary in order to have even a working knowledge of oral surgery.

The Student of Oral Surgery.

From the standpoint of broad training and diagnostic ability of the students, it is unfortunate that the dental curriculum has but three years. It is just at the end of this time in the medical schools that the medical student begins to get the principles of surgery. Why is this the condition? Simply up to this time he has been preparing himself in those fundamental principles which will enable him to comprehend the principles of surgery, without which the principles of the process of repair would mean little to him.

Garretson, the father of oral surgery, has said: "That if you would succeed in the practice of oral surgery, lay your foundation in anatomy. Upon this place many courses in physiology. Then build the superstructure in pathology. Fasten and bind all together with cement, of the principles of surgery, and a mansion thus constructed will shelter and protect you throughout your professional career. Without such foundation principles you build only upon shifting sand."

Then the student in our dental colleges of today should have such a foundation and superstructure before taking up the principles of surgery, and I would add to this foundation described by the great Garretson, embryology, that the student may have a knowledge of the origin of the tissues, and histology, that he may know of their structure.

Now this, we believe, is the training that the dental student must have before he is ready to comprehend the principles of surgery, because he must know these principles before he can make practical application of them in the region of the oral cavity.

When are our dental students qualified to begin the study of these principles? The answer is, when they have had a thorough knowledge of the fundamental principles, and not before.

We would not expect a student just finishing the grades in our high schools to take up such studies as calculus, or any of the higher mathematics, and comprehend their significance; neither can we expect a dental student to know much about the subject of oral surgery at the end of his college course if he

has not been able to get a keen perception of these foundation principles before taking up those which form the basis of surgery.

In the average dental college we do not believe that the student is qualified to take up the course in oral surgery before the beginning of the senior year, for the reason that up to this time he has not been sufficiently grounded in these fundamental principles.

In the University of Michigan our students at the end of the junior year have had their descriptive and practical anatomy, histology, embryology, physiology, and one course in oral pathology, so when they begin the course in oral surgery at the beginning of their senior year they are able to at least partially comprehend its importance. The course in oral pathology is continued throughout the senior year. This, with the two courses in oral surgery which are given throughout the senior year, we feel, gives the students an understanding of the subject which will enable him to diagnose those pathological conditions of the mouth with which he comes in contact in the practice of dentistry, and also a knowledge of what can be accomplished in an operative way. With this knowledge firmly fixed he will be able to intelligently advise his patients. We believe this is as far as it is practical to carry the student in the dental college today, in oral surgery, with the college curriculum covering a period of but three years.

The Teacher in Oral Surgery.

The personal equation of the teacher is a most vital factor in any educational process. A teacher who is endowed with a strong personality, who has the ability to present his subject so that the students are able to comprehend its significance, and who has had personal and practical experience in that which he is teaching, will be a great factor in the successful teaching of oral surgery.

Personal experience is one of the greatest factors to successful teaching, and nowhere in the entire dental curriculum is this more necessary than to the teacher of oral surgery.

The teacher who can go from the laboratory to the class room is better able to present his subject than one whose knowledge is limited to theoretical training. So with the teacher of oral surgery, if he is able to present practical applications of that which he is teaching, he will be better able to hold the interest of the class. Without a keen interest is

displayed on the part of the student, the teacher cannot hope to obtain the best results in the teaching of any subject.

It is not an easy matter to interest the average dental student in the subject of oral surgery, for the reason that he feels that any teaching that does not apply directly to the treatment of the teeth is not an essential factor to his future knowledge.

In order, then, to instruct the average dental student in this subject, the teacher must make his course just as attractive and practical as possible.

This brings us down then to the fourth factor in the process of teaching, viz:

METHODS.

What are we teaching our students in oral surgery and how are we doing it?

Members of the dental profession, generally, take but little interest in the subject. This is so pronounced that the student becomes more or less influenced by this apathy and is apt to look upon this subject as unimportant or unnecessary. This lack of interest is demonstrated at almost any meeting of an association of dentists. When two papers are scheduled on the program, one on the mechanical side of dentistry and one on oral surgery, the large majority will listen with great attention to the paper on mechanical dentistry, and only the few who are especially interested will hear the one on oral surgery. Why is this? Is it because this subject is of little importance to the general practitioner of dentistry, or is it that while they were students they were not sufficiently impressed with its significance as an important factor to their general knowledge for the treatment of the teeth and surrounding tissues?

It is not without a feeling of temerity that the writer suggests that the methods of teaching oral surgery in some of our dental colleges are perhaps responsible for some of this lack of interest. Is it because we are attempting to make oral surgeons out of students who are not sufficiently prepared to comprehend the subject rather than broad diagnosticians in dentistry, and in so doing are failing in both, that the average dentist looks upon the subject as of so little consequence?

If we, as teachers in the dental colleges, are to lift dentistry to a higher plane than that of a mechanical art, it be-

hooves the teacher of the sciences to fix the matter in the mind of the student so he cannot forget it. Then this knowledge becomes a part of him, and forms an important factor in a broad career. How and when can this knowledge best be imparted to the student in oral surgery?

In the University of Michigan our students are not prepared to take up this subject in an intelligent manner until the beginning of the senior year, for the reasons that have been previously mentioned. Up to this time they are being prepared for this course with the preliminary subjects which have been outlined, so we can at this time proceed with those vital principles affecting the process of repair and the student is qualified to comprehend them.

Oral surgery is a subject that cannot be taught alone, but in order for the student to comprehend the subject, the whole field of the principles of surgery must be presented to him, emphasizing the diagnosis and treatment of those lesions which appear in the oral cavity. The interdependence of the whole organism must be impressed upon the student, showing the relation of lesions of the oral cavity with other parts of the body. The thorough understanding of these principles of general surgery is absolutely necessary in teaching diagnosis of pathological conditions of the oral cavity, which, in the writer's opinion, is the paramount issue in the teaching of the course in oral surgery in the dental college of today.

In our school at Ann Arbor these principles are taught in a course of seventy-two lectures by the professor of surgery, and these principles are exemplified by a clinic each week in the university hospital. As this hospital is a State institution there is an abundance of clinical material to illustrate in a practical manner that which has been taught in the class room.

Pathological conditions in their incipiency are shown, as well as the same conditions in their advance stages, thus impressing the student with the necessity of an early diagnosis. Dr. Vilray P. Blair, in his text-book on "Surgery and Diseases of the Mouth and Jaws," makes this emphatic statement: "Until the much-desired cancer specific is discovered it is mainly to the educated dentist, grounded in general oral pathology, who makes a complete survey of the whole mouth that the medical profession and the public must look to reduce the now increasing death rate from cancer of the tongue." These words coming from such an able and experienced man as Dr.

Blair we must accept as authentic, and in doing so we, as teachers of oral surgery, must assume the tremendous responsibility of teaching our students the importance of an early recognition of malignant diseases, and attempt to qualify them accordingly.

The manner in which we aim to impress upon our students the importance of the early recognition of any disease affecting the mouth, is to show them cases in their incipiency and have them witness the surgical procedure for the relief of the same, then present to them the same pathological condition at an advanced stage and the radical operation that is frequently necessary.

We find that this method of procedure will impress the student with the great importance of the diagnosis being made early in these pathological conditions, and they do not forget it as they would if they read it in a text-book, or had nothing but their lecture notes to impress them. We try to carry this scheme throughout the entire course; in other words, "driving home" and clinching in the clinic that which has been taught in the lecture room.

We do not attempt to teach the student the technic of the operation in the clinic, except in such cases of minor surgery as are of importance to him as a practicing dentist. The primary object of the clinic is to fix the matter of the lectures in the minds of the students so that they will not forget it. During the year the students are brought in contact in the clinic with many of those conditions which are described to them in the lecture room. Special attention is given to anaesthetics, and the responsibility of the dentist connected therewith is clearly demonstrated. The writer believes that it is the duty of the teacher in oral surgery to discourage his students in the common practice among dentists of administering or having a physician administer general anaesthetics of any kind without a thorough physical examination having been previously made of the patient.

In connection with the teaching of anaesthetics, the teaching of physical diagnosis is a very important factor. The student of dentistry should not only be able to fairly judge of the condition of the circulatory and respiratory systems, but should have a thorough knowledge of the condition of the kidneys. Not only is this knowledge essential in connection with the administration of anaesthetics, but is equally impor-

tant in the successful treatment of some of the pathological conditions of the oral cavity.

If we are to teach our students to become broad diagnosticians in dentistry, the matter of taking a complete history of cases must not be overlooked in the teaching. The manner of taking a history of a case is not a simple matter, and sometimes important points might be overlooked by the student. As a means of simplying the matter, blanks with printed suggestions on the margins may be supplied to the student that will enable him to become familiar in obtaining a fairly good history of many cases. In conjunction with the regular course in oral surgery, we are now giving a lecture and clinical course in applied oral surgery, taking up in detail those pathological conditions of the oral cavity with which the dentist comes in daily contact, and we exemplify those principles taught in the lecture room by clinics at the university hospital. This course covers thirty-four lectures and one clinic hour a week throughout the year.

In this course, extraction of teeth is taken up in detail. The average dental practitioner looks upon the operation of the extraction of teeth altogether too lightly. There is no doubt but that more harm results from accidents and errors in extracting teeth than from any other phase of dental practice. The study of the instruments used in extracting, and methods of handling them, are discussed and illustrated. The need of more than dental cleanliness in this operation is taught, that the operation is a surgical operation is shown and surgical cleanliness is demanded. The students are taught to use the same precautions in the post-operative treatment that the general surgeon uses in the after treatment of any wound of the same character and extent in any other part of the body. Here they learn the necessity of thorough sterilization. We believe that at this time sterilization of instruments can be more firmly fixed in the minds of the students than in any other place in the course. The average dental student is interested in the subject of extraction of teeth, and several lecture hours are devoted to this important part of the course. The laity are not sufficiently educated in the subject of extraction of teeth, due wholly to the information they have received from time to time from the dental profession. They look upon this part of the dental practice altogether too lightly. The department of oral surgery can do much in elevating this part

of our work to a higher and more dignified standard in dental practice by teaching our dental students the surgical principles of extraction, thereby impressing upon them that it is a surgical operation and not a mechanical one. The operation for the removal of impacted teeth is given a great deal of attention in this course, and we try to impress upon our students that this operation is not a simple one and must be considered a surgical operation in every detail, and all surgical precautions must be used in the performance of the same. The writer believes a great deal of harm to the patient, as well as to dentistry itself, has been done in the past by lack of education of dental students along this line.

By educating the dentist to the seriousness of the operation for the removal of impacted teeth, the patient himself will become educated and will cheerfully submit himself to the proper conditions under which this operation can most successfully be accomplished. We impress upon our students the necessity of obtaining a radiograph previous to the operation, and that every surgical precaution be used in the operation for removal of the tooth that any major operation in surgery demands.

Fractures of the jaws resulting from unskillful operations of this kind are not uncommon, and when such cases are presented at the hospital for treatment, they are discussed before the class and treatment proceeded with.

Fractures of the jaw resulting from any injury are taken up in this course and the students have an opportunity of caring for the patient during the convalescing period. In all such cases we resort to the radiograph to indicate the position and nature of the fracture. We impress upon our students at all times to resort to the radiograph in any abnormal condition of the oral cavity when a positive diagnosis cannot otherwise be made. All pathological conditions of the mouth that fall within the field of dental surgery are taken up in this course and the technic of operative procedure is taught.

Modeling compound impressions of tumors of the mouth, cleft palate and any other abnormality are taken and models made of the same and tinted to resemble the natural conditions, so that the student may study them and after the operation compare them with the post-operative results. These models are photographed and lantern slides are made, so that stereopticon lectures can be given on these cases, and the student

becomes more impressed and the matter more definitely fixed in his mind than by any other means of which we have knowledge.

Photographs of cases before and after treatment, when practicable, are made and lantern slides obtained from them. These are introduced in our lectures, and experience has proven that the student becomes more familiar with the subject matter in this manner than by merely getting it from a text-book.

Relative to text-books on oral surgery, we are not following any one of them definitely in our lectures. In our opinion the ideal text-book on oral surgery for dental students has not yet been printed. Perhaps the reason for this is, that the conditions for the best work in oral surgery in one school will not obtain in another, and to have a text-book that would be ideal would not be possible with the varied conditions of the dental curriculum as it exists today in our dental colleges.

We endeavor to utilize that which in our opinion is the best that is in all of the standard texts on the subject. This we modify to suit the conditions of our students in the endeavor to make men and women in our profession that will be proficient in diagnosing and treating these lesions of the mouth and jaws with which they come in contact in the practice of dentistry.

DISCUSSION.

Dr. T. L. Gilmer, Chicago

The paper we have just listened to is a most excellent one, and the advice given as to the teaching of oral surgery is so nearly in keeping with that which we have in the Northwestern University Dental School that did I tell you of all of our work there in detail I should have to say over again too much of what the essayist has already said.

Nothing pleases me more than to see the younger men becoming interested in the subject, because having been so long interested in it myself I know the need of it.

I shall follow as nearly as possible in what I may have to say the four factors which were stated in the early part of Dr. Lyons' paper. If you notice something in my discussion which sounds very much like what was said by Dr. Black this afternoon in his discussion of the paper on pathology, you can realize

that it is because he has been associated with me in my work for a long time and naturally has thoughts in the same channel.

Four factors have been brought forward by the essayist for our consideration—the object, the student, the teacher and the method.

We must all agree that the object should be such as to make the student as nearly as possible a complete dentist. We should instill into his mind the thought that surgery is not an adornment, but that it is as much a part of the curriculum as any of the other subjects taught, and that it cannot and must not be lightly considered. There should be frequent meetings of the faculty, and one or more of the heads of the departments should be called upon at these meetings to speak for his department. He should tell of his work and its progress in order that the whole teaching system may be correlated. Team work cannot be done unless there is co-operation, and with team work by the faculty the student will be impressed with the interdependence of the several branches taught.

Pathology of the mouth and jaws is of more importance to the dentist at this time than ever before, since medical men have discovered in the mouth the focus of so many lesions in other parts of the body. The dental student must be made to understand these relations and compelled to equip himself that he may have a general intelligence of the whole subject. The weakest part of dental and medical education is the lack in the training of students in a comprehensive understanding of oral pathology. Pathology of the mouth, jaws and adjacent parts and organs is of itself a big subject.

To be a good technician in oral surgery is greatly to be desired, but to be a great pathologist is of still greater importance, since technic is of little value to the dentist unless he knows and understands the reason for the employment of his technical knowledge. Even though a student does not expect to become an oral surgeon he should have good knowledge of the principles of surgery, that he may be able to make intelligent diagnosis to safeguard his patients and refer them to those who do specialize in surgery.

I quite agree with the essayist that the time allotted the student in the three years' course is altogether too short for grounding him well in oral surgery, but we should so plan the work of the dental school that he shall have the fullest benefit possible under the circumstances. In order that we may accom-

plish this, the teaching of general and special pathology and bacteriology should be so arranged that they will perfectly fit in with the teaching of the principles of surgery. With physiology, anatomy, embryology, pathology and bacteriology well understood, surgery is more easily comprehended; indeed, these studies are essential to a knowledge of surgery. Dr. Lyons is quite correct when he says that to better understand the tissues of the body, embryology is an essential.

I have quite a sympathy for the teacher of oral surgery. He is handicapped from the fact that many dentists, especially the older practitioners, do not regard surgery as being a serious part of the curriculum of dentistry, and they unconsciously impress prospective students with this idea, and it is not easy to rid them of the fallacy. Some members of some faculties are often so obsessed with the importance of their own branch that they do not plan their teaching to be helpful to the oral surgery department. If one examines the equipment of the several departments in dental schools he will easily discover in most of them that the surgical department is the poorest equipped of all. This can be due to but one cause, the lack of a real knowledge of the importance of this branch.

Great teachers are born, not made. Some have great ability as lecturers, but are poor teachers; others are good teachers, but poor lecturers. A combination of the two is rare, but greatly to be desired. To hold and teach a class one must give students good food for thought and compel them to think. The work in our department must be popularized, not be irrelevant talk, but by presenting to the student interesting facts bearing forcefully and directly on the subject taught. The teacher, no matter how familiar he may be with the subject he teaches, should formulate his lecture definitely before presenting it, that he may give it forcefully and in its natural sequence.

I am satisfied that no greater truth has been stated by the essayist than when he emphasized the responsibility of the teacher of oral surgery. The mechanics of dentistry are very important and I have great respect both for the subject and for those teaching them, but oral surgery deals with conditions which may mean the life or death of the patient; therefore, there is much added responsibility.

True, the clinic is very important both for the purpose of clinching, as the paper says, what has been taught in lec-

ture, and to familiarize the students with surgical procedures. I do believe that the teaching of technic in clinical operations, even in operations which the student as a dentist may not perform, has a broadening tendency. However, am not inclined to repeat often, major operations before the class. If the student sees one or two such operations he has seen all that it is profitable for him to witness. Dentists, as a rule, shrink from doing the simplest minor surgical operations. If they have seen a few major operations it will, I believe, have had a tendency, by way of contrast, to make them less timid about performing the minor surgical things which all dentists should do. The technic of minor surgery of the mouth should be exemplified over and over again.

Anaesthesia and physical diagnosis is not taught in the Northwestern by the oral surgeon; the time is too short. Besides, it seems to me, that while the oral surgeon should be well versed in these subjects, they may be better taught by those who have made a special study of these branches. I do not believe that we will often find teachers of general surgery in the medical schools giving instruction in either anaesthesia or physical diagnosis. Neither do we find the rhinologist or the gynecologist teaching anaesthesia or physical diagnosis; still both do surgery. As to the importance to the dentist of a knowledge of physical diagnosis and anaesthesia, I heartily agree with Dr. Lyons.

History writing and diagnosis should be taught under the supervision of competent assistants to the chair of oral surgery. As a stimulant to good history writing our alumni association each year gives a cash premium to the two students writing the best histories in the oral surgery clinic. All of our histories, with operation and subsequent treatment, with result added, are filed. When the history is read by the student to the class it is criticized and corrected. In Northwestern we use blanks similar to those described by Dr. Lyons.

Much time should be given to the instruction in the reading and interpretation of radiographs. Every school should have an X-ray apparatus and some one always at hand thoroughly competent to make good radiographs. This is really an essential adjunct both to the operative, surgical and orthodontic departments of every dental school.

It is not unusual for practicing dentists to overlook incipient pathological lesions which, if neglected, develop into most

malignant growths. This comes from the fact that as students they were not taught to examine the whole mouth, their attention being directed only to the teeth. In my teaching I emphasize the importance of careful examination of the entire oral cavity of patients assigned to students in the operative and prosthetic clinic, to discover any lesion or abnormality that may be present. If patients are found with pathological conditions which naturally should be referred to the oral surgical clinic, the student brings the case to me and the after treatment is done by him. He is also at my side during the examination and operation.

Dr. F. B. Moorehead, Chicago.

The individual who has a well-grounded academic knowledge; whose training has been logical and comprehensive, and who has a modicum of technical skill, is likely to serve his patients better and do less harm than the person who has a more highly developed technic, but who is lacking in intellectual perspective. The first is likely to develop into a practitioner of parts, while the latter becomes the victim of dogma and routine. The one will carefully consider the "weightier matters of the law," while the other is consumed with "mint, anise and cummin." Evolution will characterize the one, while a "dead level" will mark the way to the other.

While the antecedents and temperament of the student are of first importance, the course of instruction, if it serves its purpose, will give him a vision and start him on in his way toward realizing his high calling. Though full fruition may be delayed, the fertilizing and nurture belong to the student or academic period. If this premise be true the course of instruction in oral surgery is not difficult to arrange. The prerequisites are obvious and well known.

I. Anatomy, which includes embryology and histology.—The course of instruction should run throughout the freshman year and the first semester of the junior year. In the freshman course the student studies embryology and general anatomy and histology, both didactic and laboratory. In the junior year, the student should study special histology and special anatomy. Here a detailed study of the head and neck are made, emphasizing specifically the parts immediately connected with dentistry.

II. Chemistry.—The study of this science is necessary to the study of histology, physiology and pathology. If, then, the student is to enjoy and profit in these studies, he must first have a good working knowledge of chemistry.

III. Physiology.—Standing alone, this is probably the most important single subject in medicine. Unfortunately, one gets beyond the college period before appreciating its scope.

IV. Bacteriology.—A good knowledge of bacteriology leads to the higher and finer arts of medicine and surgery.

V. Pathology.—This is the surgeon's vade mecum. The practice of surgery is two-tenths technic and eight-tenths pathology; and this is about the proportion in which the two should be taught and emphasized. The course in pathology should run throughout the junior and senior years, and should be both didactic and laboratory—general pathology in the former and special pathology in the latter.

If these five subjects have been properly taught, the senior student is prepared to intelligently begin the formal study of oral surgery.

It would seem to us that the most important thing to be emphasized in this discussion is the fact that there is no such thing as oral surgery per se. It is but a segment of general surgery. The essayist very properly emphasizes this fact when he states that "it is not within the province of the dental college to make oral surgeons out of its students." Back of the practice of oral surgery there must lie a thoroughgoing training in general medicine and general surgery. If properly presented the course in oral surgery will give to the student an interpretation of the magnitude and responsibility of dental practice. To equip the student with an intelligent working knowledge of all disease processes in the mouth and adnexa is both the opportunity and function of this course.

Just how the desired result is to be obtained will vary within certain limits. The teacher must always be greater than the method.

While the lecture method is becoming less and less emphasized in general education processes, it will be difficult, for the present, to get away from formal didactic instruction in this course. We do not see how else the student may get a comprehensive view of the whole matter. Here we must teach general medicine and general surgery in order to give the

student a logical basis for analysis. This is to guard against the "danger of a little learning." The lecture course, therefore, should place before the student a definite picture of the whole truth. The didactic instruction, in other words, if we may use the expression, should be catholic in character. This same spirit and effort should be carried over into the clinical course. In this latter course the student should take the largest possible part. The greatest amount of time possible should be given to case study. Such work is always a challenge both to the teacher and the taught. Cases may be assigned to students in groups of three or four at the beginning of the period, and reviewed by the principal before the entire class. Such an opportunity for instruction is without limit. Every phase of medicine and surgery is illustrated. The sense of medical responsibility in dental practice is coming on apace. As far, therefore, as it is possible the course in oral surgery should make a physician out of the student of dentistry. The true surgeon never ceases to be a physician.

In the clinic, anatomy, histology, physiology, chemistry and pathology are reviewed and retaught. In addition, we teach clinical and laboratory diagnosis, and diagnosis comprehends all medical knowledge. It is the fine art in medicine.

Surgical technic should have a definite emphasis on all matters which fall within the limits of the practice of general dentistry. This, we believe, is better done by the use of cadaver, manikin and model than by use of the living subject.

A certain amount of clinical operative surgery is necessary to complete the student's view of the whole subject, but case study and analysis is of far greater importance. In a word, the interests of the student and future practitioner are best met by that type of instruction which furnishes him with a vision, and, as far as may be, serves to "establish his goings."

Dr. Lyons (closing the discussion) You have been very patient during the reading of the paper, and because of the lateness of the hour I will simply thank you for the interest shown in the subject.

REPORT OF COMMISSION ON TEXT-BOOKS.

In the report of your Text-Book Commission of last year was included a tabulated list of all the books, both reference and

text, which were in use by thirty colleges of our membership of forty-seven who responded to a request asking for their lists of books used. This tabulation you have before you in your printed reports. I regret that it was possibly not made definitely clear that the numbers opposite each author's name indicated the number of the college using such book according to the number on the list of colleges placed at the beginning of the report; also, that on page 143, line 1, a typographical error in the reference list gave "Turner's Text-Book of Prosthetic Dentistry" as used in reference by No. 114, when it should have been Nos. 1 and 14. These are simple errors, but we desire to call your attention to them.

Whether or not this tabulated list has been of value to the members we do not know, but we trust it may have been of some assistance.

During the year, there has been submitted to your Commission for definite review, two manuscripts, one of which has, with slight reservation, met with approval, and the other, after careful perusal, returned to its author for further consideration. The work of Dr. McGehee on "Operative Technics" has been carefully prepared, and, while not meeting the needs of every teacher of the subject, goes a long way in the right direction. With all due regard for Dr. McGehee, may we suggest that the illustrations which are to be used in future works be submitted with the manuscript. This was not done in this case, and hence there are some points upon which criticism will inevitably fall. The volume on "Dental Radiology," by Dr. Satterlee, has met with approval. It was not presented to the Commission in manuscript, hence the opinion is based upon the completed work. It appears well adapted for practical class text-book use, with but one reservation, viz: Its size and shape. This may possibly be improved in a new edition.

The work on "Elementary and Dental Radiography," by Dr. Raper, is also a most excellent work and will meet the requirements of many teachers of the subject, as well as members of the profession, as both a text and reference book. The size of this volume, also, is open to criticism.

Seven-seven books have been sent by the various publishers for inspection, as follows:

Consolidated Dental Manufacturing Company:

Elementary and Dental Radiography.—Raper.

Appleton & Co.:

Practice of Dentistry.—Greenbaum.
Oral Surgery.—McCurdy.
Plastic and Cosmetic Surgery.—Kolle.
Legal Medicine and Toxicology.—Emerson.
Minor Surgery.—Foote.

W. B. Saunders Company:

Dental State Board Questions and Answers.—Goepp.
Anatomy and Oral Surgery.—Ivy.
Histology.—Hill.
Pathology.—McConnell.
Materia Medica and Pharmacology.—Bastedo.
Medical Dictionary.—Dorland.
Pocket Dictionary.—Dorland.
Essentials of Bacteriology.

Lea & Febiger:

Anatomy.—Gerrish.
Anatomy.—Gray.
Oral Surgery.—Brown.
Pathology and Therapeutics.—Burchard.
Dental Metallurgy.—Essig and Koenig.
History of Dentistry.—Guerini.
Dental Anatomy and Physiology.—Hopewell-Smith.
Operative Dentistry.—Kirk.
Orthodontia.—Lischer.
Materia Medica.—Long.
Dental Jurisprudence.—Mikell.
Dental Histology.—Noyes.
Dental Electro-Therapeutics.—Sturridge.
Prosthetic Dentistry.—Turner.
Prosthetic Dentistry.—Wilson.
Manual of Chemistry.—Simon.

J. B. Lippincott Company:

Operative Dentistry.—Marshall.
Oral Hygiene and Mouth Sepsis.—Marshall.
Qualitative Analysis.—Marshall.
Success in Dental Practice.—Johnson.

S. S. White Dental Manufacturing Company:

Treatment of Malocclusion of the Teeth.—Angle.
Descriptive Anatomy of the Human Teeth.—Black.
Principles and Practice of Filling Teeth.—Johnson.
Injuries and Surgical Diseases of the Face, Mouth and Jaws.—Marshall.

Lee S. Smith & Son:

Formulary.—Prinz.
Lectures on Anaesthetics.—DeFord.
Practical Orthodontist.

F. A. Davis Company:

Hand-Book of Anatomy.—Young.
Text-Book of Physiology.—Ott.
Text-Book of Chemistry.—Hill.
Operative Surgery.—McGrath.
Ear, Nose and Throat.—Phillips.
Principles of Surgery.—Senn.
Laboratory Diagnosis.—Faught.
Health and Medical Inspection of School Children.—Cornell.
Diseases of the Stomach.—Bassler.
Old Age Deferred.—Lorand.
Health and Longevity Through Rational Diet.—Lorand.

P. Blakiston's Son & Co.:

Operative and Dental Anatomy Technics.—McGehee.
Physiology.—Halliburton.
Micro-Organisms.—MacNeal.
Physiology.—Jones and Bunce.
Anatomy and Histology of the Mouth and Teeth.—Broomell and Fischelis.
Pocket Dictionary.—Gould.
Pocket Cyclopedia.—Gould and Pylé.
Histology.—Stohr.
Embryology.—McMurrich.
Operative Dentistry.—Johnson.
Dental Materia Medica, Pharmacology and Therapeutics.—Buckley.
Dictionary.—Harris.
Physiology.—Brubaker.
Quiz Compends:
Anatomy.—Potter.
Histology.—Radasch.
Bacteriology.—Pitfield.
Materia Medica.—Potter.
Physiology.—Brubaker.

Medico-Dental Publishing Company:

Operative Dentistry.—Black.
Inorganic Chemistry.—Gordin.
Principles of Organic Chemistry.—Gordin.

Of these, many have appeared before you on previous occasions for inspection. Those which are new, or of a later edition than previously reported are as follows:

1. Dental Electro-Therapeutics.—Sturridge.
2. First Principles of Organic Chemistry.—Gordin.
3. Local Anaesthesia.—Fischer.
4. Principles and Practice of Crown and Bridge Work (4th Edition.)—Goslee.
5. Text-Book of Physiology (4th Edition).—Ott.
6. Hand-Book of Anatomy.—Young.

7. Diseases of the Stomach and Upper Alimentary Tract.—Bassler.
8. Operative Dentistry (4th Edition).—Marshall.
9. Health and Longevity Through Rational Diet.—Lorand.
10. Old Age Deferred.—Lorand.
11. Essentials of Laboratory Diagnosis.—Faught.
12. Essentials of Bacteriology (7th Edition).—Ball-Wilson.
13. Health and Medical Inspection of School Children.—Cornell.
14. Operative Surgery (4th Edition).—McGrath.
15. Success in Dental Practice (2nd Edition).—Johnson.
16. Qualitative Analysis Medicus (8th Edition).—Marshall.
17. Quiz Compends:
    Anatomy (7th Edition).—Potter.
    Physiology (13th Edition).—Brubaker.
    Histology (3rd Edition).—Radasch.
    Bacteriology (2nd Edition).—Pitfield.
    Materia Medica (7th Edition).—Potter.
18. Outlines of Physiology (3rd Edition).—Jones and Bunce.
19. Harris' Dictionary (6th Edition).
20. Dental Radiology.—Satterlee.
21. Elementary and Dental Radiography.—Raper.
22. Operative and Dental Anatomy Technics.—McGehee.

Your Commission commend the following for text-book purposes:

1. Operative and Dental Anatomy Technics.—McGehee.
2. Dental Radiology.—Satterlee.

And for reference:

Elementary and Dental Radiography.—Raper.

Submitted January 29, 1914.

ELLISON HILLYER, Chairman,
A. E. WEBSTER,
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THE TEACHING OF LABORATORY METHODS OF DIAGNOSIS.

DR. J. S. GRAHAM, TORONTO, CANADA.

I have to thank you most sincerely for the honor you have done me in asking me to take up the question of the teaching of laboratory methods, and their relationship to the infirmary and practice.

The relationship of dentistry to the study of medicine is becoming more and more a recognized fact. This we see not

only in the attitude of one profession towards the other, but also, and which is very important, by the attitude of the laity. That this has been brought about to the extent it has is largely due to the laboratory and to the teaching the student there receives. I think you will all agree with me that this feeling should be fostered. This we are endeavoring to do in our city by lectures to medical students by a dental surgeon and through the appointment of dental services to the hospitals.

In the case of the Hospital for Sick Children, to which I am attached, it is the intention of Dr. Bothwell to organize a complete dental service with the same status as that of a medical service. This has not yet been fully developed by Dr. Bothwell, but will be in operation, we trust, in the course of a few months. Personally, I would acknowledge the great benefit that association with the faculty and study body of our college has been to me. You may say it is a little hard on the students at first, and I quite agree with you. In the course of my education, however, one question has struck me as not yet being solved by our course. It is this: "Is the scope of our teaching sufficiently broad?" The answer to this question by teachers of your standing and experience must be of great value.

The ideal course for a student in fitting himself for the practice of dentistry would be a medical course, during which time dentistry would be taught each year. This course would last six or seven years. The student would have hospital training in medicine, as well as infirmary work in dentistry. If, after graduation he could follow both branches for a short time, so much the better. I make this last statement from observation of the men doing special work in medicine, more especially of the nose and throat men. Certainly of these the most brilliant are they who have first practiced medicine, and then have gradually been able to specialize, and to my mind it is as difficult a task to arrive near the summit of the dental profession as it is to that of the specialty I have alluded to. The cases are not, of course, parallel, but the principles underlying the physiological conditions and pathological changes are the same in both instances. Those of you who have taken a preliminary course in medicine do not, I feel sure, ever regret it. The same question occurs in the study of medicine, whether or no it is better to first take a degree in science before entering the study of medicine. Undoubtedly it is, but I feel sure that

we all know some men with a science degree whom we can justly regard as our inferiors. I like to think so anyway.

What is the advantage of prolonged study? Is it simply a training of the mind that has made it more receptive for later teaching, or has actual knowledge been gained? The second question to be answered is whether or not it would be advisable or justifiable to have some such course in the preparation for the study of dentistry? I would judge that it is not so much a question of mind training that makes the preliminary course of value as it is of knowledge gained. Of what then does this gain consist? Of a mass of facts and theories that are certainly of no practical value in the practice of either profession? I do not think so, but I think it is rather due to the fact that these men have a better knowledge of the principles underlying health and diseases. The reason we find some practitioners just as good men without such preliminary degree lies in the fact that these men have mastered and understand these principles. Herein lies probably the answer to the second question: Would it be advisable or justifiable to make such a course compulsory before entering the study of dentistry? I do not think that this is necessary or even advisable for the rank and file, but undoubtedly, for those with some private means who are going to be investigators such a course would be useful. On the other hand, there is no doubt in my mind that these basic principles can be thoroughly ground into the student during his course of four years if much patience and repetition be used.

Now we arrive at our original query: Is the scope of our teaching sufficiently broad? If one examines the curricula of our colleges he would certainly say that the scope was broad enough, with physics, chemistry (organic and inorganic), physiological chemistry, physiology, histology, bacteriology and pathology. The scope of teaching is certainly broad, but I think the reason the student at the end of a four years' course displays such a happy and blissful ignorance of much that he has been taught, is due partly to human frailty and partly to the fact that he does not receive what we term in medicine "bedside teaching," or in the case of the dental student, infirmary clinics, where the correlation of these subjects may be demonstrated and practical instruction given in methods of diagnosis. Besides the lack of individual instruction in methods by which we arrive at a proper diagnosis of mouth conditions,

the teaching is also somewhat to blame. For instance, until this year, we taught histology only in the freshman year. Plenty of time was given us, and a fairly comprehensive course was given to the students. At the end of the term we felt gratified with the result of the examinations and of the term work. This year Dr. Noyes' plan of giving histology to the sophomore class, especially the histology of the mouth and teeth, was followed. The course commenced after Christmas, and consists of twenty hours of laboratory work to each half of the class. My assistant, who was conducting the work, tells me that though the teaching of this class is very easy, yet the amount that they have forgotten is absurd. Dr. Webster the other day asked a junior, who was preparing a cavity, how he would recognize the dentine. The answer was, "By blood dripping from it." I could have murdered that man, but it serves to show that our teaching should be more continuous throughout the course, say four or five lantern-demonstration quizzes each year, following the course given in such subjects as these, and, further, that a term examination be required. This possibly might be omitted in the senior year, when the infirmary clinics would take their place.

The plan to be followed in these clinics would be to have clinical history cards such as I shall refer to later. One or two suitable cases might be allotted during the year to each man of the senior year. If we commenced with only one case for each man it would be a decided advance.

I would have the student take a complete history; make a complete bacteriological examination where possible, urinalysis, blood counts and estimation of haemoglobin, luetin and tuberculin reactions where indicated, examination of mouth secretions, etc., and, where possible, have the student, under supervision, remove a piece of diseased tissue for sectioning and diagnosis. The man to help the student prepare the work for the clinic, which would take place once a week, would be a scholarship man in the laboratory. The clinic to be held by the professor of clinical dentistry in conjunction with the professor of bacteriology and pathology. Some such course is necessary, otherwise the teaching of these advanced subjects is useless. By a system of filing of histories and cross indexing the college would soon have much valuable data collected.

Before considering some of the various diseases of the mouth to be observed in the infirmary, it may perhaps not be

out of place to mention two or three of the many objective symptoms of general disease related to mouth conditions which present themselves to the dental surgeon. The pale lips and gums of the anaemic patient at once suggest the necessity for inquiring into the general state of health, and the presence or absence of anaemia can only be accurately determined by the use of the haemocytometer and haemoglobinometer and these facts recorded. How otherwise can these symptoms be adequately demonstrated in relation to their cause? And how can the student remember their significance when met again? When, for example, the lips are markedly cyanosed he must think of advanced bronchitis, a dilated right heart or other obstruction to the circulation. He must be taught that in such a case it would be a proper procedure to obtain a blood pressure reading before the administration of an anæsthetic, either general or local, such as novocaine or cocaine, if an extensive operation were contemplated.

The offensive breath of the dyspeptic and the sufferer of ozoena should demand a brief inquiry into the general condition of the patient, and this to be noted on his history card, with a view to directing him into proper remedial channels; while the sweetish breath of the diabetic would be easily confirmed by the laboratory report on the urine showing the presence of grape sugar.

In the list of diseases of the mouth that are readily demonstrable by clinical and laboratory methods, the spreading membranous stomatitis or thrush of the young and debilitated older persons may be taken as an example. In it the oidium albicans, the superficially growing fungus of this disease, can easily be exhibited in teased preparations under the microscope and differentiated from the aspergilus and other moulds occasionally found in various parts of the pharynx. Again, in noma or other forms of gangrenous stomatitis, the smear and cultures may disclose the presence of the bacillus fusiformis with its accompanying spirochete, or the diphtheria bacillus, which has been demonstrated by some observers. The symbiosis of the bacillus fusiformis and spirochete, which are responsible for the ulcerative pharyngeal condition known as Vincent's angina, can frequently be demonstrated in various necrotic infections in the mouth, and seem to bear a certain relation to some of them as a causative factor. The comparatively rare disease of suppurative stomatitis with abscess

formation would probably give a culture of one of the ordinary pus cocci.

Let us briefly consider the syphilitic lesions of the mouth which the student may encounter. These lesions may manifest themselves in the primary, secondary or tertiary stages of the disease. In the primary stage the chancre usually appearing on the lips or on the tip of the tongue. In the secondary an erythema, diffuse or in circumscribed patches, leading particularly on the lips to fissures and erosions. Then, again, the mucous plaques which may appear during secondary stage or later in the disease. These may be present on the cheeks and palate or on the lips, and on the pillars and arch of the fauces; at first a warty thickening, which often breaks down, leaving shallow ulcers; the gummas, which are found in the substance of the tongue and in the gums. Clinical confirmation of the diagnosis may often be determined bacteriologically by the student from the serum of the chancre, and especially from scrapings of the mucous plaques, the spirochetoe pallida being shown in smears stained by Giemsa's method or by the dark illumination in the hanging drop. In later stages of the disease and where smears fail to complete and confirm the diagnosis a Waserman reaction should be done.

Tuberculosis of the mouth is usually secondary, and is exhibited by tubercles along the edge of the tongue. These tend to break down into ulcers with thickened edges with a softer consistency than in carcinoma. Stained smears will probably confirm a primary focus in the lungs, or histological examination of the edge and floor of the ulcer, the character of the secondary infection.

Actinomycosis may start in the cheek occasionally, and more rarely in the gums, and spreads into the bone. It can only be diagnosed by the microscopical findings in the smears.

We will now turn from the inflammatory diseases and briefly mention some of the new growths which are of interest from the standpoint of clinical and laboratory diagnosis. From the connective tissues the fibroma, lipoma and myxoma are occasionally met with. The epulis may be a fibroma or a giant-celled myeloma. Of the malignant tumors, of course, the commonest are the epethelioma or squamous-celled carcinoma. The epetheliomata are found usually in the lips or the tongue, and less frequently in the gums. Microscopical examination is advisable and nearly always essential in tumors

of the mouth. It is essential for the student to have their histological structure made clear to him, to have a definite understanding of the relationship between the clinical picture and the histological anatomy of the tissue.

Suitable charts of a convenient size to show the usual skin eruptions, and covering a fairly wide range of the pathological mouth conditions, should be provided. These charts would be a ready reference for the student and would be used during the clinic.

Many of the above-mentioned diseases of the mouth are, of course, not frequently met with in the infirmary. The septic cases are by far the most common, and the relationship of these to the general health of the individual would be instilled into the student by repetition. It would not be long before the infirmary would be the recognized and accepted place, by the poor and the near-poor, where all mouth conditions are best treated. Local treatment under supervision would be carried out by the student assigned to the case, and such prescribing as might be required by one of the professors in charge of the clinic.

The student on leaving college would feel to a greater extent than he does at present that not only did the authorities feel that he was proficient in the art of his profession, but also that with work and application he might some day consider himself to be a specialist in diseases of the mouth.

The Relation of the Graduate to the Laboratory.

We feel that the graduate does not use the laboratory to the extent he should. Each graduating class is given instruction as to how tissues and cultures should be sent to the laboratory for diagnosis, but the number of specimens received during the year is pitifully small. I would like to make of the pathological laboratory an information bureau, where the graduate would send his specimens for sectioning and diagnosis, specimens for museum purposes, and cultures properly made for bacteriological diagnosis, etc.

New work is constantly coming out in regard to vaccines and serums. At the laboratory he could get an opinion of the benefits likely to be derived in a given case, methods of administration, etc. Then, again, I would have him apply there for references of the literature. It would tend to make the outside dental profession a reading profession, and in this connection *I*

would like to see each graduate subscribe to at least one journal on scientific medicine. He would find much of interest, and it would be sure to open up new fields of thought. By outside dental profession I refer to those unattached to colleges and removed from centers of teaching. Reading and work for publication by men so situated both in the dental and medical profession is extremely difficult and arduous, as they lack stimulus of teaching and contact of numbers of men in their profession. The inside men I would also like to see use the laboratory more than they do at the present, and to do there their own work.

I would like to see some such plan as this adopted by our colleges: To have a scholarship given by the college to the most promising man in the graduating class. This scholarship must be made attractive, of such a sum that the graduate might hope to clear after paying his office expenses in the first year of practice. He would be given a piece of work to do during the year, which must be ready for publication at the end of his term, say ten months. He would have the preparation of the sections, etc., for the class, and act as a medium by which the infirmary would be brought into closer contact with the laboratory. He must also help the students in the preparation of their cases for clinical demonstration. We could then have for teaching purposes a group of men we could draft into the colleges as teachers, who could immediately take up the work with little or no preliminary instruction. The benefit of such a post-graduate course must, I think, appeal to all good men if they only realize that they can afford the time.

Before closing let me thank you for your kindness in listening to a very imperfect paper, in spite of which I consider the subject to be not unworthy of your notice.

DISCUSSION.

Dr. K. C. Brashear, Columbus.

It certainly gives me pleasure to be on the program for discussion of this valuable paper, and I am only sorry I did not have more time to devote to its perusal. As you all know, we have been very busy since arriving in your city with the business of the Institute and the entertainment so generously provided for us. I feel a little bit like the Frenchman

who was studying the English language. Coming across the word "fast," he learned that when this word was applied to a horse it meant that it could run rapidly, to color that it would not run, to friends that the relation was close and dear, to nautical terms tight and firm, and to woman that she acted regardless of the proprieties. And so he thought the language was hard to learn, and wondered why the English people wanted so many meanings for one word. He finally concluded that if those who talked the English language were satisfied he should try to be satisfied also. But when he had gone a little farther with his work he came across this: "The last one won one more than any other one had ever won before." This was one too much for him, and so it is with me. I feel unable to properly discuss a paper so valuable to all of us in the conservation of human life, guarding as it were the gateway to eighty per cent. of the diseases known to develop in the human body. It is appalling, gentlemen, to think that such an important subject should not be more and better cared for. I heartily concur in everything that the essayist has given you and still go farther into the depth and truth of this subject.

What would the physician amount to without his training in physical diagnosis, and especially without his knowledge of laboratory and scientific methods as applied to the diagnosis of disease? I can remember well a master mind that has since passed away, inculcating into our minds day by day and month by month, year after year, the diagnostic signs and the laboratory truths of every disease. When you have such training as this you have a foundation upon which to build; when you have those principles firmly imbedded in your mind, then, and only then, will you be capable of practicing successfully. When one knows the condition present, any one can treat it.

Why should not a dentist be just as well prepared as is the physician in the matter of diagnosis? Many times we are the first to come in contact with and recognize many of the diseases that have been overlooked by our brother practitioners in medicine. The medical man is lame on diagnosis in many instances, not that he has not been taught the branch thoroughly, but that the subject is so broad and deep that years are required to perfect these things if perfection is ever reached. Within the last few months it remained for a dentist to diagnose the following three rather obscure cases of syphilis treated by a reputable physician: One diagnosed as an erup-

tive fever, one as a laryngitis, and the other as a neuritis. Also two cases of lead poisoning that were treated as cases of ordinary anemia; one case of so-called harpes zoster disclosed under the microscope as carcinoma; one case of so-called epithelioma was by the aid of the microscope discovered to be but the result of a process of chronic inflammation.

I have illustrated the subject with these few cases simply to impress upon you that we are in a stage of progress, and the school that does not give the student the benefit of sufficient laboratory experience to be able to know what should be done is little short of criminal.

The student should begin the study of diagnosis in the freshman year by a thorough course in histology, because therein lies the foundation for diagnosis by laboratory methods. Histology bears the same relation to diagnosis as does anatomy to surgery, and you will all agree that a surgeon would be a failure were not his anatomy perfect. Later we must follow up the study of histology by a very thorough course in pathology, because a man cannot recognize diseased tissues unless he knows normal tissue. Then comes the important subject of bacteriology.

I do not mean to say that a man must do all this work himself, but do say that he must be able to recognize the necessity of such examinations and have a qualified laboratory man to carry out the work.

Further, we should teach them the necessity of determining the blood pressure of every person just after thorough examination of the heart, lungs and kidneys, preparatory to the administration of any anaesthetic. Our present method of teaching these things is hardly broad enough to enable a man to intelligently diagnose many cases of lesion of these organs and reach a reasonable conclusion as to the conditions present which would render the giving of an anaesthetic detrimental to the case. We should also teach the student the various diseased conditions which may be present, especially in the lungs.

I believe that the average course in physiological chemistry should occupy not less than two hours each week.

I agree with the essayist as to the desirability of training our students in the matter of history cards. This training is especially helpful if we allow him to take the history and go on through the case, then have him write a paper on it which he will read before the class, or allow him to present it to the

professor and be graded upon it. In some subjects it might be well to assign a certain branch or part, to each student and have him, outside of school hours, write a thesis upon it. I care not whether he gets the material for this from his own mind or from books, if he writes a thesis and presents it to his teacher he is going to remember what he wrote. I think it would be a good thing to have him use charts as in medical schools, then his mind would be impressed with the facts illustrated. And also, as suggested by the essayist, to make slides and tests in the laboratory, which enforces upon his mind the underlying principles.

Another thing which would be of value where we have medical departments in connection with our schools would be the use of the free clinics, especially along the line of syphilitic lesions in the mouth. Unless a man is very familiar with these conditions he might not be able to recognize them simply from the descriptions in books, because what a man sees in actual life remains with him longer than that which he reads in books. It would, I believe, be a good thing to make the attendance at these clinics compulsory, so that the students may see what the actual conditions are, and especially those that are obscure. It is not hard to recognize ordinary diseases, but it is difficult to make a differential diagnosis in obscure cases.

There is one thing we are a little shy in, and that is a book on physical diagnosis from the dental standpoint. Usually the subject of physical diagnosis for the use of dental students is combined with other subjects in one book. If some one with ability in this line would write a text-book on physical diagnosis for dental students, I think it would be very profitable.

And so there are many things in this paper I am heartily in favor of, and I think the doctor is to be congratulated on the work he is doing, for apparently he is preparing his men for higher and better lives. We can all, if we will, impress upon our students a great deal that will be useful to them—the work that they should do and the great interest they should take in preparing themselves to serve their fellow-men. There is no doubt that the dentist, if properly trained, can a great many times be of great benefit in saving persons from hours of pain and sorrow just by recognizing in its beginnings a pathological condition in the mouth. I believe that all dental students are at present lame on physical diagnosis. Even though

medical students are lame in the same way, as practitioners, they get so much more clinical work along these lines every day that finally they become very proficient.

I wish to thank you for this honor, and regret I cannot present my ideas in the way I should. If I had received the paper earlier I would have been able to discuss it more efficiently.

Dr. Eli H. Long, Buffalo.

The paper presented by Dr. Graham is certainly one that is very stimulating, and augurs well for the future in that it is looking in the right direction—that of broadening the dental course. I have felt for a long time that this is essential, and it pleases me that others are looking in the same direction and feeling that we must give our students a broader foundation in the principles of general medicine and surgery.

A complete medical course for the dental student is ideal, but I think we will all agree that, at the present time at least, it is not practicable. We cannot expect a man to spend more than four years at most in obtaining his professional education. While there are a few men who are taking a combined course, or who will supplement or precede their dental course by the medical, this will always be done by the exceptional student. I have been rather disappointed in not being able to get more of our best men to take that kind of a course. It seems to me that the demands upon the teacher of dental students in the future will be such that the dental teacher should, with a few exceptions, have a medical training. This is inevitable if we are going to give to our students the broad foundation that is necessary for their best usefulness. I am glad to see that the essayist emphasizes the mastering of the underlying principles of health and disease. Whether a man takes in a preliminary medical course, or by text-book reading, or post-graduate work, it is important. And I need only to refer to the enlarging fields of vaccine treatment, the studies in immunity, and the development of biological reactions in syphilis, tuberculosis, etc., to remind you that a man, in order to properly present any of the dental subjects at the present time, ought to master these essential principles of health and disease.

It seems to me that the essayist's suggestion of an infirmary clinic is a most excellent one. Just as the interne in medicine has his training in the hospital after his four years of college work, and there learns by actual experience, in many cases, the accurate taking of histories, the close observation of every essential point, and the art of diagnosis, so there are many cases coming to the dental infirmary which would furnish just as good opportunity for the dental student to become educated along these lines. And we ought to seize that opportunity. I feel, however, that the essayist has laid out a rather large program, but, at the same time, I realize that his suggestions must be regarded and probably are intended, as ideal rather than such as could be at once put fully into effect. The suggestion of a bacteriological examination in any given case, urinalysis, blood count, hemoglobin estimation, and, in special cases, the tuberculin reaction for tuberculosis and the Wassermann reaction for syphilis, the examination of mouth secretions and of the tissues in case of any new growth—if our students are to be trained to be able to carry out all these different lines of investigation, we should very soon have to enlarge our course, not simply to four years, but to five, because it takes a great deal of time and considerable experience to become proficient in carrying out these different examinations and reactions, even after much special study. We do not have the facilities in our colleges for making the Wassermann test. We should have to apply to the medical department or to the board of health for those tests.

I believe the danger in enlarging, as suggested, will come in about this way: That the student may have a rather superficial knowledge of these various diagnostic processes, but will inevitably lack the power of discrimination. That is what the medical interne learns in his hospital training—the power to discriminate. To illustrate: A new diagnostic point is brought forward, it is emphasized and lauded, and enthusiastic persons and medical students will think it is a great thing. In five years we will hear nothing of it. For instance, at the present time we do not hear very much about the opsonin treatment, which has been rather superseded by the more complete study of immunity and the employment of vaccines. Now anyone who pins his faith to the opsonin theory, while it is all right

and correct and useful in its way, will be following something that had been largely superseded by newer methods.

Permit me to call attention to what I think is a little point for criticism in the paper, and that is the reference to some of the syphilitic lesions of the mouth, particularly the mucous patch. I am afraid the description is a little misleading. If I read the paper aright, the essayist spoke of the mucous patch beginning with a warty thickening. My observation in most cases of mucous patch is that they are very flat, sometimes so slightly raised that there may be a question as to whether the spot or patch is not simply one of the whitish spots we often see on the normal mucous membrane.

As to the matter of physical diagnosis. I thoroughly believe in teaching physical diagnosis to dental students to the limit of the time that we can give to it. But I believe that it can be overdone. And I base that belief upon this statement: That you will not be able, in the time at your disposal, to make diagnosticians of your students in the direction of heart and lung diseases; and I speak from considerable experience with medical students. After the thorough training that medical students have, when they come to their interne year in the hospital, many are hardly able to make a conclusive diagnosis except in the simpler cases. So the fact is that it takes a great deal of observation to become sufficiently expert to make a reliable diagnosis of a heart condition or of the less common lung conditions. My position has been about this: That when I familiarize the students with the normal heart sounds and the normal breathing sounds, and then have them listen in a number of cases to heart murmurs, so that they may be able to detect them when they exist, and also, if cases are available, have them observe some well-marked abnormal lung conditions, I feel that that is pretty nearly as far as we are warranted in going at the present time. With the most thorough course we could give I feel that the dental student would not be able to make a discriminating diagnosis and decide the question as to whether or not that heart would allow the administration of an anaesthetic.

If you will permit me, I will indicate some directions in which I think enlargement of our course could profitably be made.

You will agree that the dental student should have some knowledge of the diseases of the nasal cavity, and it is just as important that he should know something of the diseases of the frontal and other accessory sinuses. He should know something about the diseases of the pharynx, then of the larynx, and of the trachea. And it goes without saying that he should have all the knowledge he possibly can get of tuberculosis, syphilis, and other general diseases. He should have special lectures upon those diseases, supplemented by as much clinical material as can be commanded. He should understand something of the relation of the thyroid gland and its secretion to the economy, likewise of the suprarenal glands and their secretions. He should, it seems to me, be thoroughly taught regarding the diseases of the thyroid gland, the condition of hyperthyroidism, to be very able to detect it in the patient, and be the means of putting the family physician, who has, perhaps, not seen the patient for some months, upon the track of a diagnosis. And then, although this may be a repetition, a study of the principles underlying immunity and the vaccine treatment should, of course, be required of our students. And, above all else, the more our students are able to see of syphilis the better. I do not, however, believe that we will be able to make of our students diagnosticians of syphilitic lesions. The occasional lesion only they will be able to diagnose.

These remarks are intended to convey the idea of caution in expecting of the dental student too much from the instruction that we can give to him in these special lines in the time that is at our disposal. And the final word would be that we ought to fit our students, not to be competent diagnosticians in general diseases, but that they may at least be able to recognize symptoms sufficiently to be justified in calling the attention of the medical man to the case and insuring proper care to the patient.

Dr. A. W. Thornton, Montreal.

I wish to say just a few words in regard to the paper, principally, perhaps, because I am in a measure responsible for having Dr. Graham present it. For some of you will remember that at the meeting of the Executive Board immediately following our last session a year ago, when the question of physical diagnosis came up, I suggested that we endeavor to get either Dr. Graham or Dr. F. Arnold

Clarkson to read a paper upon this subject. And I am glad we have Dr. Graham here, because he has presented the subject in an admirable way. Then, there is another reason why I am glad to have heard him, which is that I was a student under Dr. Graham, as were also Dr. McDonagh and Dr. Webster, although you would probably hardly think that such could be the case. Last winter we had the privilege of spending two evenings every week with Dr. Graham along the lines he has been speaking of, and I can assure you he has the happy faculty of inspiring those who listen to him, in regard to the methods of teaching that he has suggested.

There is another reason why I am glad this paper has been presented. We heard last night one word upon which the changes were rung several times—the word practical. And now, this morning, we hear again the same word—practical—in Dr. Graham's paper. But there is a great difference between the meaning attached to the word practical as used last night and again this morning. The practical last night meant the putting in of fillings and the making of crowns and bridges; the practical this morning means the establishing of fundamental principles, the grounding of the work upon which the whole superstructure of dentistry must be built. And there is not a teacher who does not realize that the dentistry of the future must, of necessity, be built upon histology and bacteriology and embryology and dental anatomy. We all know that the men whom we teach may go out somewhat deficient in their ability to put in perfect fillings, but as he stands at his chair day after day he will become more proficient in that part of his work. But there are very few who will be students of these fundamental branches after they go out. So, of necessity, that foundation must be laid in the schools, and I believe that if the dentists of the country could get into their minds the difference between the practical of which we heard last night and the practical of which we heard this morning, it would put a stop to what we have lately seen of peripatetic venders of quackery and charlatanism going through this country and giving post-graduate courses, even in some cases, to ethical practitioners, placing emphasis on the selling of service and materials and, incidentally, on the selling of some particular line of manufactured goods. Not only has it gone that far, but in some cases, I am sorry to say, that such men have found their way into the colleges, and have spoken

to the students, putting the emphasis right on these factors—the obtaining of big fees and the selling of gold and silver at a very enhanced price, and in that way poisoning, at the very head of the stream, the minds of the dental practitioners of the future. I am very, very desirous that the dentists who are teaching, the men who see the vision, the men who realize what the dentistry of today is, shall fully appreciate these things, for you will remember that at Chicago last year Dr. Mayo stated that the next epoch in medicine was to come from the side of dentistry. And if that be true, it will not be from the side of inserting fillings and the making of crowns and bridges; it will be from the side of the recognition of pathological conditions and the means of combating those conditions. And if we recognize these things we will not have men coming and forming classes and having their so-called students signing a solemn league and covenant that they will not divulge the mighty secrets which have been imparted to them.

Dr. A. G. Friedrichs, New Orleans.

This paper marks an epoch in the advance of dentistry. It has been my ambition and the idea of my professional life that the day would come when the emphasis would be placed upon that particular side of our work to which the essayist has called our attention. If you will review the history of medicine you will find that the same character of evolution came there. Thirty years ago the microscope was looked upon as a curiosity. It was just the beginning of that very epoch in medicine that we are now facing in our profession. Being a graduate in medicine, necessarily, when I took charge of the dental institution with which I am connected, it was with the desire that these very questions that are now being brought forth here with such emphasis and consideration might be put in practice. But at that time this was an utter impossibility owing to the preconceived notions that practitioners of dentistry then had. We have gradually come out of that. One of the first remarks I made to the student body was this: The day of the shoemaker and blacksmith is gone; we have grown out of that. I did not say this with the idea of laying any odium upon the man who manipulates with his fingers. The surgeon stands in the same relation to his profession that we do to ours; if not an exact mechanician he is a failure as a surgeon, and so it is with us. But the underlying principles, the reason for

all these things, were entirely overlooked in our earlier curricula.

As I understand it, what we are facing in order that we may be able to carry on this course in its ideal expression, is the fact that we haven't sufficient time. Our curriculum has to be limited because we haven't sufficient time to teach what we have to do. And one of the elements that stands out in my mind with more significance than any other is that we must first extend the time, so that we can give our students a certain amount of instruction to fit them to at least understand and appreciate these conditions. We can not do it within the time at our disposal.

In regard to the matter of physical diagnosis: As much as we can possibly hope for is to give a man an understanding of the normal chest, and that is about all. Even as far as the physician goes, when it comes to a question of the more minute detail as to the proper and correct diagnosis of any lesion within the chest, he himself will not presume, with all his experience, to attempt to diagnose that condition. But what we can do is to bring the profession to that particular standpoint where they will be able to at least suspect—in other words, to stand as a kind of sentinel to direct inspection, and that is about all we can expect to do.

I want to congratulate Dr. Graham. The ideas he has presented here have been before us for many years, but we have been faced with the difficulty I have mentioned. I know that every man connected with dental schools realizes, as I do, the importance of this subject, and I am sure the day has about come when the light of another era will dawn. Henceforth those who wish the advancement of the profession will be only those who appreciate and understand the importance and necessity of this subject.

Dr. J. B. Wilmott, Toronto, Canada.

I think this question should be considered, not exclusively from the medical standpoint, but from the dental standpoint as well.

I presume most of the gentlemen present know something of the genesis of dental education, and whatever of blame or mischief may have resulted from the fact that dentistry is not taught as a specialty of medicine, does not lie

with the dental profession, but with the medical faculties. The organization of the first dental college in the year 1840 followed a definite refusal of the faculty of the Medical College of Baltimore to undertake the teaching of dentistry as a part of its curriculum. From that time to the present dentists have been thrown largely on their own resources for professional education. In many cases, probably in most cases, in which, in connection with medical faculties, dental faculties have been organized, they have been a sort of appendix to the medical department, and in many, the fees from the dental department, to a very considerable extent, supported the medical faculty. They were in no sense looked upon as equals. The universities in these later days are coming slowly to organize dental departments that are independent, but even yet there are few which hold the same relation to the university that is held by the faculties of arts, law or medicine. I am making these observations to show that, from the educational point of view, the dental school has been at a disadvantage. We hear today a good deal of criticism of the proprietary dental schools. Any other kind of school for the teaching of dentistry was an impossibility in the first place.

Neither universities nor medical colleges would do anything for them, and if dentists were to do anything for themselves at all it must necessarily be in the direction of proprietary schools. I think that probably the last proprietary dental school has been organized. Sooner or later they will all be either nominally or actually associated with universities, but the proprietary school was the necessary means by which the dental profession has reached the position in which it stands today.

I am not entering a protest against what is asked for in Dr. Graham's paper. On the contrary, I do not think a dentist can be too well educated in any direction. There is no calling in life, except, possibly, that of a litterateur, in which general information has as great a money value as it has to the dentist. He stands for two, three or, possibly, four hours at a sitting over an intelligent, cultured patient, and unless he can impress his patient that he possesses reasonable intelligence, outside his professional knowledge, and a good degree of culture, he is at a financial disadvantage with the best class of patients and the clientele he would desire to have.

For this reason I would favor not only a wider knowledge in medicine but a wider education in all directions, and especially in English literature and in art. I presume we are all of one mind that the time given to the course in a dental school should be utilized to best enable the graduate to follow his calling successfully. While the altruistic idea in professional life is service, not mere money-making, the average dental student expects, and properly expects, that his profession will afford him a comfortable income. If the time given to the several studies in the dental curriculum is not so divided as to furnish him with the ability to earn such an income, in my judgment, a dental school is missing its proper function. The point I wish to make is, that in arranging our curriculum and directing our instruction we should so carefully differentiate the "merely desirable" from the "absolutely essential" that we may not exploit the "desirable" at the expense of the "essential".

What are the things that are essential to a dentist today —not what may be essential to him fifty years hence—but essential to him now as he is going out from our schools to attempt to make a living for himself in the practice of dentistry? He may be the most expert "oral diagnostician" in America, but if he has not manipulative skill he will soon find that there is no place for him in the practice of dentistry. While this is undoubtedly true, no modern dental school confines its teaching to the technic of the profession, a fairly wide scientific course is required, especially is attention given to the fundamental branches which underlie the teaching of medicine: histology, physiology, bacteriology, pathology. When I compare the course given in my student days with that now given I think that those who have conducted dental educational institutions have a great deal on which to congratulate themselves in the advance that has been made. Are the dental schools at the present time giving their students a reasonable opportunity to qualify themselves to satisfactorily discharge their duty as dentists when they shall have completed their college course?

I think they are; the teaching is not perfect, of course, but it is well up to the standard of other professional schools. I think I am well within the bounds of truth when I say that the average dentist is as well qualified to discharge the duty

to his fellow citizens that his profession demands as is the average physician, lawyer, or clergyman.

In regard to the author of the paper under discussion, no member of our staff is more esteemed or respected than he. Dr. Graham is not only peculiarly fitted by education and natural endowment for the position he occupies, but he is further qualified in that in anything he undertakes he becomes an enthusiast, and in all teaching, enthusiasm counts for a great deal.

I am sure that Dr. Graham will understand that I do not intend to antagonize him. But as the paper was read and discussed it presented this idea to me in relation to the practice of medicine: that the dentist is to be educated to be a sort of detective for the benefit of the physician or surgeon. That is to say, his patient consults him suffering from pulpitis; instead of confining himself to pulpitis, he makes a careful observation of the whole oral cavity, if haply, he may find something to which to direct the attention of the patient's physician. As dentists we are, by law, restricted, and, I think, properly so, to the practice of our profession, and that confines us to the treatment of the dental organs and to any disease or diseases of the oral cavity which have their origin in a dental lesion, or which interferes with the successful treatment of a dental lesion. I am not sure but that, under strict legal interpretation, we may be allowed to follow the pus of an abscess down into the stomach and note its harmful effect on the functions of digestion, assimilation and nutrition and to prescribe, but if we did, I am afraid we would be in for a battle in the courts.

It is certainly desirable, and I am pleased that Dr. Graham has taken this position, that certain physical manifestations in the oral cavity should be noted by the dentist. I am pleased that our students are being taught to recognize the physical symptoms of constitutional diseases.

Why should they be thus taught? In the case of syphilis and tuberculosis, solely for self-protection. In the case of the other ailments to which reference has been made, as a matter of information for himself, not for the purpose of prescribing for them. I have no sympathy with the dentist who dabbles in the practice of medicine. If he wishes to keep on good terms with the physicians in his neighborhood he will be wise

to keep clear of any suspicion of trespassing on the physician's domain.

I have no objection to medical men, in a gathering such as this, lecturing us on our lack of knowledge of pathology and diagnosis—we probably need it badly enough—but I sometimes wish we might get back at them in their own schools. On one occasion I had a medical student consult me after he had suffered intensely all night. He had pain in his face, which at first it was difficult to locate, finally it seemed to settle in a cuspid tooth.

After examining it for a moment I said to him, "You expect to graduate in a month " He replied, "Yes." "Now, in all the lectures you have heard, in all the clinics which you have attended during the four years of your course, have you heard anything in lecture, or talk on pathology, on diagnosis, or histology, or practice, which would throw any light on the pathology of your present condition?" "Nothing," was his reply. I said to him, "In a month's time you are going out West to practice. If a patient should come to you suffering as you have been for 24 hours, what would you prescribe for him." His reply was, "I could suggest nothing but a pair of forceps." This was an unusually bright student. In our institutions are our sins of omission anything worse than this? Is there any worse oversight in our teaching of pathology or diagnosis?

Mr. President, I am not sure that I should have said these things. I fear that I will be looked upon as a reactionary, who desires to narrow the field of dentistry. I am not; I desire to widen the field. What I am urging is that we put "first things first," that the "essential" be not overshadowed by the simply "desirable." A smattering of medicine, or a full course in medicine, is of no value to a dentist who has not manipulative skill.

There is one other thought which I desire to present to the Institute. From the beginning of our professional educational work we have emphasized surgery, to the entire neglect of medicine. Every college has a professor of general surgery; I do not know of one which has a professor of medicine. Except for the principles of asepsis which it involves and the processes of healing which it teaches, general surgery has little of real interest to the dentist. On the other hand, a very

large class of serious pathological conditions which come within the cognizance of medicine are now known to be largely due to abnormal conditions in the oral cavity.

The time has come when in all our colleges we should have a professor of medicine, a physician, who has given sufficient study to the subject to be able to point out to the student in detail the systemic pathological sequences which follow as a result of local pathological conditions in the oral cavity. The greatest need in all our colleges is that of instruction in this direction. I have in mind the possibility of a post-graduate course in dentistry which will entirely ignore dental technic, so-called; it will be a course in dentistry devoted wholly to scientific investigation and training, and to the medical aspects and the consequences of diseased conditions of the oral cavity. I do not know that many of our men would have the means to attend a school of that kind, and yet probably five per cent. of graduates, which would mean about one hundred of them each year in America, might be able before going into practice, or even after being in practice for a time, to attend a post-graduate course of that kind, in which the very things that Dr. Long and Dr. Graham have been advocating would have a more prominent part; this to be associated with a modern, progressive hospital, in which the medical aspect of the various lesions of the mouth that are first purely dental, should be taken into account and given very serious consideration and teaching, not only in the lecture room, but illustrative cases studied in the hospital wards. I trust that the time is not very far distant when we will have something along this line. I am not familiar with medical polyclinics, but I presume the course referred to would be something the same in dental practice that the polyclinics are in medicine; that is, the graduates have been through their course, they have the fundamental principles, they have a certain amount of ability for practice, but they want to take a wider range in subjects necessarily somewhat neglected in the regular dental course.

Dr. W. H. O. McGehee, Cincinnati.

There is one point I would like to bring out in regard to Dr. Graham's paper. I am heartily in accord with the position Dr. Graham takes with reference to the methods of diagnosis in dentistry. With all due respect

to Dr. Willmott, I disagree with most of the things that he has said.

The point I wish especially to bring out is this: I think Dr. Graham has been unfortunate in choosing the title of his paper with special reference to the word "physical." As I understand Dr. Graham's paper, it includes all methods of diagnosis used in dentistry. In regard to the term physical diagnosis, our medical friends give a different interpretation of the phrase as used by Dr. Graham. If you will take the trouble to look up the meaning of the words physical diagnosis in most of the medical dictionaries you will find that the term is intended to cover simply methods of diagnosis by means of the senses, as by inspection of the patient, by palpation or the laying on of hands, and by auscultation and percussion. The term does not include laboratory methods of diagnosis.

I have taught in previous years a course on physical diagnosis along strict lines as laid down for that branch by Tyson and also by Cabot, whose works are considered authoritative on that subject, and I confine my course entirely to the question of finding objective symptoms of disease of the lungs and heart in order that we may determine whether a certain patient is in proper condition for the administration of an anaesthetic.

On looking over the chart which was published by this Institute a year or two ago, I find that there are probably only five or six dental schools which teach the subject of physical diagnosis. I would like very much to know just what is being included in this course on physical diagnosis as taught by the men in those schools.

I think the matter of the meaning of the word physical as employed in our schools, should be referred to the Commission on Nomenclature, in order that we may have a proper understanding of the title of Dr. Graham's paper.

Dr. Graham (closing the discussion). I think you will agree that I tried to keep clear of all controversial possibilities in connection with this subject when I remind you that I never said a word in my paper about the stethoscope, the heart or lungs—nothing of this nature. Here we are teaching all these different branches of science, organic chemistry, physiological

chemistry, etc., then when you ask the students simple questions they do not understand, and the reason is that they are not shown the relation of those branches to their work. I would reach these subjects only with the idea of making these men better dentists. Should they attempt to take up medicine as well as dentistry in a four-year course, they would be poor dentists and poor medical men. If, on the other hand, we can show these men the relationship of these different scientific subjects to their work, then we are doing good. That was my idea.

Dr. Long has referred to my unfortunate description of the mucous patch as "warty." That was a poor word to use in this connection and was not intended to indicate a raised appearance.

I think Dr. Willmott does not just appreciate what I mean by this paper. The work outlined is not going to take up any more time. We will simply give a couple of cases to the senior men, who will work out these laboratory conditions and write down the results, the idea being to present these cases to the class as a whole.

REPORT OF THE SECRETARY-TREASURER OF THE DENTAL INDEX BUREAU.

At the time of the Institute meeting in January, 1913. the situation in which the Dental Index Bureau found itself was about as follows:

The number of subscribers was so small, and but little headway could be made in securing new subscriptions, partly because of the price set upon them, partly because of the lack of a complete published volume which might demonstrate the value of the index. Your Secretary understood from Dr. Black that the index for 1908 was complete, and that the 1909 index was in such shape that the two could be published in one volume in a short time. The discussion of the Secretary's report at that time brought out the fact that the Institute collectively and individually was deeply interested in having the index brought forth to the light of day, and was willing to expedite this glad event by financial assistance provided information could be obtained as to what the cost of publication would be.

Shortly after the 1913 meeting your Secretary communicated with Dr. Black, who had charge of the indexing and publication that it was the sense of the Institute that the Index Bureau should proceed to determine, as nearly as possible, the cost of publishing the first volume, and communicate this information to the Institute members. The report on publication will, accordingly, be given by Dr. Black.

Inasmuch as it had seemed best to determine the cost of publication as the next step in the matter, and inasmuch as it seemed probable that that information could soon be had, and, in fact, should be had, before continuing the campaign for subscriptions, your Secretary has made no effort to get new subscriptions during the year. As a result of the work done during the year 1912, however, several subscriptions have come in and others are known to be available.

Following is the financial report:

New subscriptions	6
Total subscribers	67
Total amount received up to January 1, 1913	$1,125.00
Amount received January, 1913, to January 1, 1914	55.37
Interest	16.98
Total	$1,197.35
Total disbursed to January 1, 1913	$ 762.87
Disbursed, January, 1913, to January 1, 1914	100.00
Total	$ 862.87
Balance in bank December 29, 1913	$ 334.48
Amount due on subscriptions	462.50
Total assets	$ 796.98

Respectfully submitted,

J. O. McCall,

Secretary-Treasurer.

DISCUSSION.

Dr. A. D. Black, Chicago.

I was in a way sorry and in a way glad that I was not here at the close of the meeting last year to hear the discussion of this subject; sorry, because I would have liked to have been here to take part in it, and glad because I think possibly more of the men who participated in the discussion than might have been the case had I been present, simply because some features were not understood, and the discussion brought out a great many views that we were not able to get in any other way.

There was some criticism of the work of the committee, and I am sorry it was not made stronger, because if we could arrive at the point where you would get mad we wouldn't have any further trouble. It would indicate an interest which had not been manifested by the members previous to that time.

The financial phase of this index proposition hasn't ever worried me very much. That is, it has not worried me nearly as much as has the proposition of getting out an index that would be accepted and used by the members of the profession, and especially by the members of this Institute, because there isn't any doubt in my mind but, if we can prepare such an index, the financial end of it can be taken care of.

Whether or not we have proceeded along the right lines heretofore in handling the financial or business end of this proposition does not make very much difference. That this index can be published for considerably less than the amount that was asked for originally I am quite satisfied now. As was mentioned by Dr. Gethro in the discussion last year, the cost per index necessarily must be settled in accordance with the number of indexes which may be taken, because there will be very little difference in the publication cost of a hundred copies and a thousand copies of the index. So when we come to the point of settling this question, it is going to resolves itself on that basis, and I doubt if it would be of any great advantage to discuss this feature now.

I know you are all interested to learn what has been done, and I am pleased to say that much more has been accomplished in the last year than in all the preceding years we

have been working on this proposition. I wish to state that most of the indexing that has been done in the last year has been done by Dr. Coolidge, for which I want to give him credit here, because our greatest trouble heretofore has been to get some one sufficiently interested in this work to do the indexing as it should be done. It is not a very pleasant task, and here is the most disagreeable feature of the work of indexing that presents itself to the indexer: Most of the best written articles can be indexed from their titles or from a very little reading of them. But as the indexer passes from the well-written article, which he naturally would be interested to read, to the poorly written one, the poorer it is the more necessary it becomes to read it in order to find out what it is about. Therefore to do the indexing properly the indexer must read all of the poorest matter in the literature and not, necessarily, for proper indexing, any of the good articles.

There have been indexed up to the present time articles in about fifty volumes of our journal literature. I am not including in this my own personal indexing of The Cosmos, which runs back to the beginning. But in the recent work, about fifty volumes, which includes at least a five-year period for the Dental Cosmos, the Review, the Brief, the Digest, the Items, the Summary, the Journal of the Allied Societies, and the Dominion, and a less number of several other journals, including the Dental Record, the Western Dental Journal, the Texas Dental Journal, the Pacific Dental Gazette, and one or two others. So that we have up to this time done a great deal more indexing than we originally expected to do previous to the publications of a volume of the index.

As I have said once or twice before in the discussion of the subject, this work was originally undertaken in the face of the fact that all previous attempts at indexing medical and dental literature, both in this country and abroad, had failed after a few years. We did not wish to get into a proposition that would terminate in that way. Therefore we have, with good reason, I think, gone slowly in this matter, to, if possible, develop, as we progress, a plan which will put us as nearly on the proper line as possible. And I have come to see more recently that the original plan which we proposed, but which was not worked out, that is, the plan of printing an annual index with a paper cover and then holding the type up so that

at the end of five years we could make a permanent volume which could be bound, is not advisable. Most men are going to judge this index and decide whether or not they believe it to be a good thing, on the first issue of it that comes to them. What would happen if we present to our members or to the profession a volume indexing our literature for but one year? The use that would be made of such an index is this: If a man had occasion to look up a subject he would consult the index, and possibly he would find in that one-year volume three or four papers on that particular subject; there probably would not be enough articles in any one year's index to give a man a comprehensive list of articles on any subject, and therefore, he would not be able to get what he wanted, and very likely he would say that the index was of little value. In other words, an index to become of value must cover a considerable period of our literature, and therefore, I believe that it is going to be the safer plan to have the first volume cover at least a period of five years. And that is the plan we have been working on without saying very much about it.

There are many other problems involved in the publication of this index, some of which it is not really necessary for us to go into here. However, I just want to say this in passing, if I may impose on your time: That an index plan for our literature can not be an ideal classification of the literature and at the same time be practical. I probably can not illustrate that better than by presenting this proposition: If, previous to the time that we had any dental journal literature, we could have made an ideal classification of the various subjects, and then if, subsequent to that period, each man who wrote a paper would have consulted that classification and picked out his subject, writing a paper upon it, then we would have had an ideal index and probably an ideal literature. But, unfortunately, that was an impossibility. So that the index which is made can not be an ideal classification of our literature and at the same time be practical. It must be an index that will fit the literature such as that literature is, to be practical and yet be in such form that the man who wishes to look up the literature of a subject can find it in the easiest possible way. And that is the plan which is involved in the making of this index. As many of you know, it involves the classification of articles not at all according to their titles, but

according to the subjects treated by those articles, and I am satisfied from the use which has already been made of this plan of indexing that it is a practical plan.

I wish I might definitely tell you now what such an index would cost, but I do not believe we can do it because it is a new thing. To do the printing of such an index is going to involve greater expense than would the printing of the same number of pages of a book, and the number we are going to be able to sell is going to modify the price. Those are things that I believe will work themselves out when the time comes. And I see no reason now, unless something should happen to Dr. Coolidge why we will not be able to get out a volume of this index, which will cover at least five years of our literature, between now and the next meeting of this organization. I hope it will be out considerably before the next meeting. But I know all these things involve delays that we can not foresee, and I do not want to make any promise. But I do only want to say this: That we have been studying this problem as carefully as we could, and we are working on it as fast as I believe we ought to under all of the circumstances surrounding the situation. And I certainly hope that when we do get out the first volume of the index you will study it before you make up your mind how good or how poor it is.

I appreciate as much as you do that we have been much longer and slower in our progress on this work than any of us expected when we undertook it. The thing looked rather easy when we first started, but the farther we got along the harder it became. I believe, however, that we now see our way out.

REPORT OF COMMISSION ON PROSTHETIC TECHNIC.

This Commission was appointed immediately after the meeting in Pittsburgh, by the Executive Board. It has been very difficult to obtain the slightest idea as to the purpose for which the Commission was appointed.

At the meeting of this body in Cincinnati in December, 1898, a Commission presented a very carefully prepared suggested syllabus on this subject. The manner in which that report was received deterred the Commission from making any further efforts, although reappointed to continue the work.*

*See proceedings of seventh annual meeting, page 49.

Fearing a similar reception and believing little improvement could be made in the former report, and realizing that each teacher will make his own course anyway, it was deemed inadvisable to burden you with such a syllabus at this time. It was thought that if it could be ascertained what was being done in this branch in each of the schools it might be possible to draw some conclusions which would be of benefit.

Early in October a letter was addressed to 46 deans, requesting the name of the person in charge of this subject, or his school. By the end of November 43 replies had been received and one other came about three weeks ago.

On the 28th of November a circular letter was sent to the instructor in charge of prosthetic technic in 43 schools. By the 1st of January 10 replies had been received—7 others since that date. What of the other 26? Only one of three conclusions may be reached: either the instructor was ashamed of his course, or he was too indifferent to any means whereby he might improve it to take the trouble necessary to reply, or the communication went astray in the mails.

In either of the two former cases it is not a fair deal to the student, now, nor to the public, later. Should there not be some situations vacant in the prosthetic departments?

The questions sent were as follows:

1. How many pieces of prosthetic technic (excluding all crown bridge work) is a student required to complete in each of the three years?
2. Describe each piece fully, stating in which year it is required.
3. Are clinics given the class in each piece?
4. Must each piece be shown to demonstrator at stated stages?
5. Is there a time limit for having each piece handed in?
6. What penalty for not having work in on time?
7. How many students to a demonstrator in the laboratory?
8. How many hours devoted to this work in each of the three years:
   (a) In clinical instruction?
   (b) In didactic instruction?
   (c) In laboratory work?
9. What metal is used for metal technics?

10. Kindly enclose any printed matter relating to this course, such as slips with descriptions, stages at which work must be shown, etc.

As the answers were so few, and some so very indefinite it will not be possible to present as helpful a report as might have been, had more interest been taken in the subject by those in the various schools, in whose care this branch has been reposed.

From the answers to the first request it is found that the 17 schools require a total of 247 cases, apart from impressions, as follows:

One school requires 31 pieces—11 in first year, 9 in second year, 8 in third year, 3 in fourth year.

One school requires 20 pieces—16 in first year, 4 in second year.

One school requires 19 pieces—12 in first year, 7 in second year.

One school requires 18 pieces—15 in first year, 2 in second year, 1 in third year.

Two schools require 16 cases—all in first year.

One school requires 15 cases—13 in first year, 2 in second year.

One school requires 14 cases—11 in first year, 3 in second year.

One school requires 14 cases—12 in first year, 2 in second year.

One school requires 13 cases—all in first year.

One school requires 12 cases—all in first year.

Two schools require 11 cases—all in first year.

One school requires 11 cases—6 in first year, 3 in second year, 2 in third year.

One school requires 10 cases—7 in first year, 3 in second year.

One school requires 9 cases—all in first year.

One school requires 7 cases—5 in first year, 2 in second year.

Of these 247 pieces 196 are in the first year, 37 in the second year, 10 in the third year, and 3 in the fourth year.

Five schools complete the subject in the first year, while 10 continue it into the second year, 3 into the third year, and one into the fourth year.

What conclusions may be drawn from the compilation of the replies?

I.—Regarding the number of pieces required; some schools must certainly increase the amount if they intend to play fair with their students. For instance, one school requires one partial upper, one partial lower with clasps, one full upper and lower gum sections, one upper and lower anatomically arranged, in the first year, and in the second year one partial upper swaged gum section and one partial lower with clasps. No cast, no teeth soldered to metal base, no lingual bar, no repair. What sort of technic equipment will a graduate of that institution possess? If other schools can find time for 20 cases, surely that school might find time for more than just mentioned.

II.—Swaged Metal Work:

One school requires 9 pieces.
Two schools require 7 pieces.
One school requires 6 pieces.
Two schools require 4 pieces.
Eight schools require 3 pieces.
Two schools require 2 pieces.
One school requires 1 piece.

Your Commission considers the student who completes nine cases has a very valuable training. Some may consider nine too many. That is merely a difference of opinion, but surely there can be no two opinions that each student should construct at least three pieces.

III.—Cast Metal Bases:

One school requires 3 cases.
Eight schools require 2 cases.
Five schools require 1 case.
Three schools require no cases.

At the present stage of dental technic education every student should have some experience in this branch, still we find three of the schools without it.

IV.—Bar Cases:

One school requires 2 lower and 2 upper cases.
One school requires 3 lower cases.
One school requires 2 lower cases.
Six schools require 1 lower case.
Eight schools require no lower cases.

The same remark might apply, and we should pity the students of those eight schools which are so far behind the procession as to neglect this hygienic method of replacement.

V.—Cases With Clasps:

Two schools require 4 cases
Two schools require 3 cases.
Seven schools require 1 case.
Six schools require no cases.

While much may be said in condemnation of this method of retention, still cases will present where such procedure is indicated, and then where will the students of those six schools be at who were never required to attempt a case in technic?

VI.—Teeth Soldered to Metal Base:

One school requires 2 cases.
Eight school require 1 case.
Eight schools require no cases.

No such technic in half the schools—what comment is necessary?

VII.—Anatomical Arrangement:

Twelve schools require cases.
Five schools require no cases.

Five of the schools appear to pay no technic attention to this recent and most valuable procedure. Are the instructors too lazy or too indifferent to master the subject themselves? What about more vacancies in the prosthetic departments?

VIII.—Repairs:

One school requires 3 cases.
Three schools require 2 cases.
Nine schools require 1 case.
Four schools require no cases.

Four schools without any training. What will their graduates do the first week in practice?

IX.—Special Attachments:

One school requires 3 cases Gilmore.
One school requires 2 cases Gilmore.
One school requires 1 case Gilmore.
Three schools require 1 case Roach.
Fourteen school require none.

These may be looked upon by many as the "frills" in dentistry, but frills are coming into fashion again, and it is

due the students of every institution that they should not only have explicit instruction in the various attachments but that they should also be required to construct at least one case so they may have some slight idea how to proceed when confronted with a case in practice where such an attachment is indicated.

X.—Impressions of Fellow Students' Mouths:
Five schools require beeswax, compound and plaster.
One school requires beeswax and compound, no plaster.
Five schools require compound and plaster, no beeswax.
Two schools require compound, no plaster, no beeswax.
Two schools require plaster, no compound, no beeswax.
Two schools require no impressions.

Just what is to be gained by spending the students' valuable time in manipulating beeswax is beyond your Commission. If that time were divided between the other two materials the student would not become any too proficient.

Why a school should require impressions in beeswax and plaster and not in impression compound is a mystery, as is also the requirement in impression compound and beeswax but not in plaster. But far greater is the mystery why no impressions are required in two schools.

These other cases are also among the requirements:

Splints:
One school requires 2 cases.
Three schools require 1 case.

Obturators:
One school requires 2 cases.

Continuous Gum Frame:
One school requires 1 case.

Celluloid:
Two schools require 1 case.

Gysi Method:
One school requires 1 case.

These are the reports from only 17 schools and, presumably, those with the better courses. Who would care to contemplate the sorrowful conditions in the other 28 schools?

Your Commission does not consider it feasible to have a standard course of prosthetic technic, but certainly a condition

more nearly approaching a standard would be attained if each school would carefully study the foregoing figures and rearrange and extend their courses.

As to the other questions: The answers were very indefinite and so varied that no conclusions may be drawn therefrom. However, it is the opinion of your Commission that every technic case should be demonstrated in stages before the class in sections and also that each step in construction by the student should be inspected and a record kept of it in some way.

Your Commission would earnestly suggest to some schools to wake up and give their students technic training in modern prosthetic dentistry.

It is recommended that a Commission on this subject be continued and an endeavor be made to obtain an outline of work from every school for compilation for next meeting and that an exhibit be made of cards, etc., used for information to the students and for keeping records in this department.

W. E. WILLMOTT,
H. V. COTTRELL,
Commission.

DISCUSSION.

Dr. W. H. O. McGehee, Cincinnati.

Because of the fact that I am a member of the Commission on Operative Technics, I do not feel specially disposed to discuss the report of the Commission on Prosthetic Technics, and I take it that some phases of the subject which I shall not touch upon will be brought out by some of the other members.

I think that Dr. Willmott's criticism in regard to teachers is good. According to this report, Dr. Willmott has been very unfortunate in being able to secure but seventeen answers out of a list of forty-odd colleges after sending out his questions. It seems to me that a teacher of prosthetic technics ought to take enough interest in his branch to co-operate with a commission that is trying hard to help him in his own work, and I would suggest that this matter be brought to the attention of these teachers by the deans of the various schools. As regards our Commission on Operative Technics, I do not know whether or not a different plan of procedure was adopted, but

we have been a little more fortunate in that when the chairman of that Commission made up his report he found that we had received forty-five replies to our questions.

There is no doubt in my mind that the functions of these two Commissions are very valuable ones. I do not intend to express the opinions of the other members of my Commission, but, personally, I would say, regarding the standardization of the course in operative technics or in prosthetic technics, that inasmuch as we are trying to standardize teaching as far as we possibly can along all lines of dentistry, I see no reason why we could not, within certain limits, standardize the teaching in prosthetic technics and in operative technics. It would certainly seem to me to be well to suggest to the various teachers of these branches a minimum course of technic work which could be adopted in all of the schools, then any school which wanted to go beyond this point could do so, and we could to quite an extent make suggestions along certain definite lines. I am sure that some of the teachers here will disagree with me on this point, but that is my personal opinion. In these branches of dentistry we are trying to reach a certain definite point; we are trying to so equip our students that when they are graduated they will be as proficient as possible along that line. Let us suppose that we are all trying to reach a common point to which four or five different roads lead; which of these roads is the best one to take in order that we may reach that point more quickly and with the least effort on our part? So it seems to me that we might strike the best road for the accomplishment of our purpose with regard to teaching any branch in dentistry, and the only way we can do that is by the suggestions made through a commission or committee of men who will study the subject thoroughly.

In regard to the teaching of prosthetic technics, I am surprised that, if I am not mistaken, Dr. Willmott has made no mention in his report of technic work along the line of inter-dental splints and obturators. It seems to me that something ought to be suggested along that line. The average graduate of our schools knows the general theory on the subject, but has no actual experience in the making of an appliance of this kind, and when he goes out into practice and a case requires the adjustment of an obturator, or an inter-dental splint, the average dentist will say to himself: How

can I get rid of this case and pass it on to somebody else? But, if during his technic course he does a little technic work along that line, he will be better qualified to care for these cases than if he had never handled a case technically or clinically.

And then, also, there ought to be included in the prosthetic technics course work along the line of those special attachments mentioned by Dr. Willmott, either the Roach or the Gilmore attachments, this to be a portion of the work in all schools.

Further, the report just presented by Dr. Willmott is so important to the men who are teaching those branches that I believe a copy of it should be sent to all the teachers in this country who are doing work along that line. Of course, all these reports are printed in our proceedings, but to my mind there is no question but that there are many teachers who do not take the trouble to read the entire proceedings of the meetings. If, therefore, a copy of the report were sent personally and directly to the teacher of that branch, he would see what the commission is trying to do; it would serve to stimulate his interest, and we might thereby secure his cooperation in the work that we are doing here.

Dr. S. H. Guilford, Phlladelphia. I am very much amazed at some of the facts brought out by Dr. Willmott's report. It is exceedingly mortifying to think that so few schools replied to the questions sent out, and also that in some instances those who did respond gave the replies they did. The report shows that some of the schools are nearly as far behind in their technic work as school children would be. I should be very sorry to have that report fall into the hands of some of the men who spoke at the banquet last night, and in order to remedy the matter as far as possible in the future I would suggest that the Commission on Prosthetic Technics for the following year be requested to formulate what it would consider the minimum amount of technic work that should be done in the schools, specifying each kind, and sending that to the deans of the different colleges, requesting each dean to look into the matter and see whether his department of prosthetic dentistry is willing to accept that, and asking for a definite reply. That would

be a step in the right direction. As it is now, with simply a report setting forth the delinquencies of the various schools, we get no results. I believe that the report, summarized perhaps, should be sent to every dean of the association, with the request that he answer indicating whether he would be willing to do the different things the Commission recommends. Then the Commission could include the replies in its report, mentioning the names of the deans, or of the schools.

Dr. Abram Hoffman, Buffalo. This report should not be passed without an extended discussion. It certainly is a thankless task to send out such a number of letters and receive so little encouragement.

While Dr. Willmott was reading the report, it occurred to me that we might have a comparative chart of this technic work. Would it not be possible, with this Commission continued, to have a chart, eight or ten feet in height and of sufficient length, with the colleges listed in the first column, the schedule number or name and literature in the next, the technic piece in the next, the time for beginning and finishing in the next, and so on? By this means the commission could make comparison and the Institute gain much by it.

Regarding Dr. McGehee's remarks upon the splint: A year or so ago I saw a Gunning splint exhibited which had been made upon a plain line articulator with no evidence of the use of the face bow, and the face bow is a necessity in that technic. It was about an inch and a half in height, with the buccal and labial flanges covering not only a portion of the crowns but most of the gum tissue. If taught in that manner it would be better omitted from the schedule.

With reference to the special attachments, I am frank to say that we have not done much with those in the prosthetic department of our school so far as the technic work is concerned. I have felt that it is an attachment that should be used with caution and judgment, and that, perhaps, with our method of teaching prosthetics, the better place to teach its use was in the prosthetic infirmary, where we can get the case in which it is indicated, giving personal demonstrations to that particular student and allowing those interested to come around and get what they can from it.

Dr. H. T. Smith, Cincinnati.

When last year I suggested the appointment of this Commission and the one on operative technics, I did so because it seemed that the Institute was getting further away from its original purpose—that of systematizing and perfecting technic methods. This has been noticeable from year to year.

My idea was the formulation of a series of questions that should cover each piece of technic work, inquiring when a piece was assigned, a description of the piece, when it was called in by the demonstrator, the method of grading it, in the operative, prosthetic, crown and bridge work and orthondontia technic departments. If the colleges would carefully and promptly reply to such a schedule of questions, these Commissions would have an opportunity of striking a balance, and of giving us what might be considered an average technic course in each one of these departments. And, having such an average course, it might not then be a difficult thing to determine what should be considered a maximum and what a minimum course for the guidance of State Boards or any other body assuming to supervise our work.

Dr. Ellison Hillyer, Brooklyn

I agree with Dr. McGehee, and somewhat with Dr. Hoffman, in regard to the splint. We formerly had that in our department as a specimen of technic work for two reasons: First, because we thought that it was a good method of actual practice; second, it gave a chance for technic work which furnished a very good opportunity for testing the vulcanization of thick pieces. But we have been converted along these lines, and the treatment of fractures has gone so definitely into the field of oral surgery that we feel that the condition is better treated by other methods directly in the oral surgery clinic.

So far as the plan of getting at the minimum technic course, I heartily endorse that. It is not always possible to bring the standard up to the highest point, there are so many conditions against it. But I think all of us would be glad to get up to as high a level as possible, and, if the opportunity is given, I have no doubt that this can be made higher and higher as the years go by.

I should, then, most decidedly want to let the Commission go on with this work. However, I do not know whether the Commission is going to be able to secure replies from the various deans any more readily than from the heads of the departments concerned, or whether, with the matter passing through the hands of the deans, they are going to make much more work for themselves. This simply makes a double handling of the situation. To my mind, the best way is to send the communication directly to the man from whom an answer is desired, and if he does not reply within a week send him another letter asking why he does not answer; then if no reply is received send a telegram:

Dr. Willmott: "Collect."

Dr. Hillyer: "Collect."

Bearing upon the lecture courses of both operative and prosthetic departments, the New York College of Dentistry established during the present session, 1913-1914, manikin head clinics for section classes of 75 men and of ten weeks duration (six hours a week for third-year students, eight hours a week for second-year students), and the following is the report of our experience:

In operative work (60 hours)—75 third-year students, operating on 75 manikin heads, fixed to 75 dental chairs, completed: 1,300 cavity preparations; 117 fillings with amalgam; 75 fillings with cement; 739 fillings with gold; 137 cast inlays (silver); 75 baked inlays (porcelain).

In prosthetic work (60 hours)—75 third-year students, operating on eight manikin heads, fixed on the labortary bench (eight men assigned to one head) completed: 75 full upper dentures, 75 full lower dentures, on the principle of anatomical articulation; 75 metal crowns (cast cusp on seamless band); 75 full upper metal plates with soldered air chamber, soldered rim and 14 single gum block teeth; 75 third-year students, operating on eight manikin heads, fixed on the laboratory bench, completed: 150 Angle's orthodontic appliances.

In operative work (80 hours)—75 second-year students, operating on 75 manikin heads, fixed to 75 dental chairs, completed: 2,229 cavity preparations; 825 fillings with amalgam; 175 fillings with cement; 1,079 fillings with tin and silver foil; 150 fillings with cohesive gold foil.

In prosthetic work (80 hours)—75 second-year students, operating on eight manikin heads, fixed on the laboratory bench (eight men assigned to one head) completed: 75 full upper dentures, 75 full lower dentures, on the principle of anatomical articulation; 75 second-year students, operating on eight manikin heads, fixed on the laboratory bench (eight men assigned to one head) completed: 100 Darby crowns; 85 Richmond crowns; 102 two-piece metal crowns; 150 seamless metal crowns; 75 bridges with 150 porcelain teeth soldered; 75 bridges with 150 detached porcelain teeth.

In addition to the foregoing section work in the manikin head clinics students (third and first-year men) completed during infirmary hours of the period from October 20 to December 31, 1913: Third-year students, on 30 manikin heads, fixed to dental chairs, made 576 cavity preparations; 576 fillings with cohesive gold. First-year students used 20 manikin heads, fixed to dental chairs, for examinations of teeth, using mouth mirror, explorer and separators; practicing the handling of excavators, scalers and cleaning instruments, and application of forceps for extractions.

(Dr. Willmott (closing the discussion). I am very sorry, indeed, that the Commission was not aware until about Christmas or after, that Dr. Smith was the originator of this idea, or we might have been able to find some reason for our being. We could get no information from anybody else, and if we had known that Dr. Smith had these ideas formulated in his mind we might have been able to give a better report.

As to the matter of securing replies to our communication, Dr. Coolidge was better known to the teachers in the schools than was I, because he communicated with them all two or three times, a year ago, in connection with the exhibit. So they were aware from their experience of last year that if they did not answer at once they would likely receive a telegram "Collect," and for this reason he received more numerous replies than I did.

In regard to Dr. Hoffman's suggestions of a chart, I think the Commission could work this out, but I doubt the advisability of placing the names of the schools upon it. It is my belief that the only way by which we can secure a great deal of this information is through treating communications as

confidential, especially in the case of those schools whose courses are not what they ought to be, and those are the institutions we are after.

DR. GUILFORD: What about my suggestion of sending to the various schools a minimum schedule, requesting that they indicate to the Commission whether or not they will accept it?

DR. WILLMOTT: This would doubtless be a good idea, but would entail an immense amount of work for the Commission between now and our next meeting. However, if the Executive Board appoints the Commissions to do this it will have to be done.

REPORT OF COMMISSION ON NOMENCLATURE.

Your Commission on Nomenclature has not undertaken any very serious or extended work this year, but has confined itself to careful revision and correction of the work of previous years. At our last meeting the Institute authorized the reprinting of the "Glossary" in its corrected or amended form, but when we of the Commission began to realize the number and importance of the new and revised terms that are coming in upon us from the various colleges we decided to postpone the publication for a year, so as to make it as complete and correct as possible and, in consequence, of more value to us all.

With this object in view, your Commission sent three copies of the former "Glossary" and three copies of the supplemental list of terms, presented at our last meeting, to each of the dental colleges comprising our membership. With them was enclosed a letter asking for suggestions of new terms and criticisms of those already tentatively adopted.

Up to the writing of this report not more than eight or ten replies have been received, but some of these contained valuable suggestions, which we will present for your consideration at this meeting. It is most unfortunate that so few schools have interested themselves in this matter, which is of so great importance to ourselves as teachers, to the pupils under our care, and to the profession at large.

In view of this, your Commission hopes at this meeting sufficient time will be set apart to go over carefully the terms in the "Glossary," as well as those in the supplemental list and the additional new ones that we have to present. A full

and deliberate consideration of the whole subject is absolutely necessary if the reprint of our "Glossary" shall be as full and correct as we desire it to be.

As the thirty dollars voted a year ago for a reprint of the "Glossary" was not expended, we would suggest that this amount be used for that purpose during the coming year, and that the actual expenses of the Commission for the past year for typewriting, multigraphing and postage, amounting to fifteen dollars, be voted at this meeting.

It has been proposed by one of our schools that for the coming year the nomenclature of dental pathology and therapeutics receive special attention on account of its importance in connection with these branches. If this be decided upon we would suggest including bacteriology also, on account of its close relationship with the aforementioned branches.

The following shows the changes that have been proposed in the list of definitions presented at the Pittsburgh meeting last year. The alterations are the words enclosed in brackets:

Abnormally—The state of being (unnatural or) abnormal. Irregularity, deformity, malformation.

Abscess—A (circumscribed) cavity, etc.

Adenoid—Glandiform glandular; as adenoid growths or vegetations (hypertrophy).

Adjustable—Capable of being adjusted (or corrected).

Air-chamber—(Relief or relief chamber.)

Alignment—The line to which adjustment is made. (Proper relation of parts.)

Alloy—A (homogeneous) compound of two or more metals.

Alveolar process—A (spongy, cellular) bone raised on the margins of the maxillary bones, which envelopes the teeth and forms their alveoli.

Amalgamate—To unite a metal or metals in an alloy with (the proper amount of) mercury.

Amalgam—An alloy or union of mercury with another metal (or metals).

Anneal—(To render metals, glass or porcelain tougher and more easily workable by heating. To heat gold for filling purposes; to drive off surface impurities and develop the quality of cohesion. To cause molecular expansion or crystalline expansion.)

Anemi—A deficiency (in quality or quantity) of blood.

Asepsis—(Exemption from putrefaction and its consequences.)

Atrophy—(A retrogressive change in parts, usually characterized by decrease in size and functional activity, due to disturbance of nutrition, local or general. Opposed to hypertrophy.)

Gangrene—Death of tissue (en mass).

Hyperplasis—The excessive aumentation of (any element of) an organ.

Hypertrophy—The undue or excessive growth or development of an organ or part (with increased functional power which tends to persist). Opposed to atrophy.

Infection—Contamination. (The successful invasion of the tissues by a pathogenic micro-organism.)

Necrosis—Local death of a part.

Sterilization—The process of freeing a substance (from bacteria and their spores).

Thrombus—A (antemortem, intravascular) clot.

Among the new terms brought to the attention of the Commission for consideration are the following:

Exodontia, a word coined from the Greek prefix "ex," out, and the substantive "odons," a tooth.

While the term conveys a definite meaning, your Commission does not feel warranted in recommending its adoption.

Nearly all medical terms with the prefix "ex" are joined to words expressing action, as

Excavate, from excavare, to hollow out.
Excision, from excidere, to cut out.
Excitant, from excitatare, to call out.
Exclusion, from excludere, to shut. out.
Exodontia means only "tooth out."

Extraction is a term sanctioned by long use and seems to us to be the better one.

Another term introduced into our terminology by some writers within a few years is prosthodontia. This has evidently been fashioned from the term orthodontia, from which it has incorrectly taken the letters "th". If correctly constructed it should be prosodontia, from "pro" or "pros" and "odons."

We already have the terms prothesis and prosthetics, derived from "pros," before or to, and "tithemi," to place, and, as they also appear in medical and surgical terminology, we think it best to retain them.

The term periodontoclasia has also been submitted. It is constructed from the three Greek words, "peri" (around), "odons" (a tooth), and "klasis" (a breaking). It is proposed that this term shall cover all conditions, relating to pyorrhea alveolaris, since it means the breaking down of tissues surrounding the root of a tooth. Your Commission is not impressed with its value.

Another suggestion is that for the word alveolectomy we substitute alveolotomy, the former word meaning "cutting from or off" the alveolus, and the latter "cutting the alveolus." We think alveolotomy the better term and would recommend its adoption.

Respectfully submitted,

S. H. GUILFORD, *Chairman.*
A. W. THORNTON.
R. W. BUNTING, *Secretary.*

REPORT OF COMMISSION ON OPERATIVE TECHNICS.

The teaching of the technical branches of dentistry, both operative and prosthetic, involves a different principle of instruction than does the teaching of the other branches in the curriculum. If the graduates of our schools are to enter upon their vocation with equal training and are to take their places in the various parts of the world to serve the people in the capacity of a dentist, surrounded by an ever-increasing demand upon their knowledge and skill, is it more to their advantage that they should receive much the same technical training in our various schools, or would they be able to render a greater service if each school varied considerably in what it should teach in the technic courses? Surely the purpose of this organization, at its origin, was to advance dental education by means of association of those teaching, as well as to offer opportunities of discussion of teaching methods and interchange of ideas. A closer relationship of the different institutions has been the subsequent outcome which we can readily see has been advantageous. Also one must recognize that

there is a gradual approach toward more uniform teaching. How could our profession consistently anticipate or hope for reciprocity in the different States throughout our land with regard to the license to practice dentistry if the teaching of the schools of different sections maintained standards and methods of teaching which were materially at variance with each other which would launch the candidates upon their careers with entirely different training. One evidence that there is a gradual approach toward uniform teaching in certain branches is seen by the statement of the fact that dental anatomy is taught in nearly every dental school in the first year, and from the same text-book. Now if we ever have a standardization of teaching in this work the same subjects should be taught in the same year, and by somewhat similar methods.

At this time I wish to submit to you a report of some data compiled at a considerable amount of labor, hoping that it will be in a way convincing of the present condition of the teaching of this subject, and will help to influence or hasten a more uniform teaching in certain parts of the work.

I wish to state that I offer no criticism whatsoever toward the teaching of any school, my only hope being that we can draw as close together on all parts of the work as we have on some of it. I will not burden you with a reading of all the questions, or all the replies, but will limit this part of the report to just those questions which are answered in such a way as to give some definite information. I have taken the liberty of including, under the head of operative technics the department of dental anatomy also, because many schools conduct the work of both departments together. I sent out letters to each school in the Institute and one other—the Illinois University School of Dentistry, which is now reinstated—making 47 in all, and have 45 replies which represents 96 per cent. of the schools.

As Dr. Willmott has said, I was after these men all last year and again this year and was perhaps able to get somewhat better results because of this fact, but it required considerable time and much writing to secure all the letters. The first response to our request resulted in about thirty letters, the second, five, while it required a considerable amount of coaxing to secure the remaining ten. In those cases, in which I was not familiar with the name of the man at the head of

the department, I addressed the letter to the "Instructor of Operative Technics." It should have been an easy matter to secure a reply from these men. If, when in attendance at the faculty meetings of their schools, the instructors of the various departments were informed of the importance of the work of this Institute, I believe they would give more attention to communications received from the different commissions. It seems to me that we should receive prompt replies from every department addressed, but, as Dr. Willmott and Dr. Guilford have said, we are not able to get replies from all. We are spending time and energy doing this work in order to benefit these various departments, and the men in the departments ought to take time to help us whenever they can.

1. In what year, or years, is operative technics taught?

   First year, 11; second year 6; first and second, 21; second and third, 1; first, second and third, 6. This shows that in 38 schools the technic course is taught in the first and second years. Probably in most of these schools a majority of the work is done in the first year.

2. How many hours are devoted to lectures? To quizzes and to laboratory work?

   The replies vary from 16 to 192 hours of lectures, and from 80 to 576 hours of laboratory work.

3. Is dental anatomy and operative technics taught by the same teacher?

   This question is answered 23 yes, and 22 no, showing about an even break on this subject.

4. In what year do you teach dental anatomy?

   Thirty-eight, first year; 5, first and second; 1, first and third; 1, first, second and third.

5. How many hours do you devote to lectures in dental anatomy, quizzes and laboratory work?

   The replies were too scattered to be of any use.

6. Does your teacher in dental anatomy include the anatomy of the maxilla and mandible, the closely related muscles, nerves, blood vessels, etc., or is that taught in the course in general anatomy?

   The object of this question was to ascertain whether the schools are teaching in the dental anatomy course the anatomy of the teeth only, or if they include some of the general anatomy as well. The replies show 36 no, 7 yes, 2 both. This reply seems to the Commission sufficient ground for not recommending the teaching of general anatomy in this course.

7. If the above is included in the study of dental anatomy, how much time is devoted to that part of the course?

   The replies were too scattered to be of any advantage.

8. What text or texts are used?

   Black, 24; Broomell, 2; Tomes, 1; Gray, 1; Black and Broomell, 6; Black and Weeks, 1; Black and Gray, 1; Black and Cunningham, 2;

Black, Broomell and Hopewell Smith, 1; Black and Paynter, 1; Black, Tomes, Gray and Cunningham, 1; Black and Choquet, 1. This shows that Black's Dental Anatomy is used in 37 schools, either alone or with other books. In looking over the report of a similar nature by Dr. Gethro in the proceedings of the meeting held in Washington, D. C., in 1910, I find that only 15 of 37 replies report the use of Black's Dental Anatomy as a text-book. This report shows a great step toward standardization of this subject.

9. Are the students required to make drawings of the various surfaces of the teeth?

Thirty-six yes, 9 no. In Dr. Gethro's report there were 24 yes, and 11 no.

10. What material is used for carving teeth, and how many teeth are carved?

Ivory, 12; bone, 5; celluloid, 7; plaster, 6; modeling compound, 1; soap, 1; French chalk, 1. The number of carvings vary from 4 to 34. The other replies were combinations of different materials, scattered in number. The Commission wishes to recommend the use of ivory, bone or celluloid for the greater part of this work, as it requires the use of dental instruments to make carvings in these materials. Additional carvings in some softer materials, as French chalk, plaster, modeling compound or soap, may be made to the advantage of a student where the time will permit.

11. Are the teeth carved to Black's measurements, or are they made to duplicate a natural tooth?

Natural teeth, 22; measurements, 15; typical, 1; model, 1; natural teeth and measurements, 2; unanswered, 4.

12. How many longitudinal and transverse sections of the teeth are required?

The report shows that 41 schools require sections of the teeth; 4 were unanswered. The number of sections was very scattered.

13. State other technic work in addition to the above required in the dental anatomy course.

1. Assembling natural teeth in the Wenker form,
2. Free-hand drawings in colors,
3. Identification of natural teeth,
4. Silhouette prints,
5. Making plaster models,
6. Carving temporary teeth,
7. Clay modeling,
8. Ground sections of teeth for histology,
9. Making vulcanite shells for articulation,
10. Technic on manikin head,
11. Examination of root canal fillings,
12. Plaster teeth set in a form-giving contact.

14. How many hours are devoted to the study of instruments, lectures, quizzes and laboratory?

The replies to this are very scattered. The teaching of instruments seems to be quite varied, as does the attitude of various instructors as to its importance.

15. Of what materials are instruments required to be made?

Instruments not taught, 14; unanswered, 14; steel, 12; brass, 4; choice of material, 1. This shows that instruments are only taught in 17 schools. The teaching of instruments involves two features, both of which carry a considerable amount of importance. First, the teaching of the technic of making an instrument in steel by annealing the blank piece of steel, shaping the angle, forming the blade and cutting edge, tempering, hardening, polishing, and finally sharpening for use. This gives the student the knowledge of instrument making. Second, the other feature is that of teaching the student the rules by which all practical dental instruments are made, giving him exercises in becoming familiar with the different classes of instruments, their parts, as the length of blade, width of blade, the angle of the blade with the shaft, and the formation of the bevel for the cutting edge. This should be done by using some soft metal like brass, which can be quickly formed and shaped, using as little time as possible in unnecessary technic; the sharpening of instruments being taught as the student learns the principles for their uses. The Commission does not feel that it is advisable to recommend at this time which method is most suited for giving the student the best knowledge of, and acquaintance with, dental instruments. However, it does seem advisable to recommend some instruction and technic of instruments. In referring back over the proceedings we find that in 1899, at Philadelphia, the Commission of Operative Technics composed of Dr. Weeks, Dr. Cattell and Dr. Dale, endorsed instrument-making of a soft material. We would submit this question to this body for consideration and thought, and, perhaps, at a near future meeting, some definite recommendation can be made.

16. Is laboratory work done in annealing, tempering and hardening steel?

Yes, 13; no, 16; unanswered, 11; in other departments, 4; voluntary, 1.

17. How many instruments are required to be made?

Steel, 4 to 16; brass, 6 to 48.

18. Is the Boley metric gauge used for obtaining the measurements, or is the student required to duplicate the measurements from a model?

Boley gauge, 20; unanswered, 16; not used, 9.

19. How many hours are devoted to the study of cavity preparation in the operative technic course (not operative dentistry course proper), lectures, quizzes, laboratory?

The replies are scattered.

20. Do you teach Black system of cavity preparation?

Yes, 45, of which 9 limited the reply by saying "modified," and 8 add the words "with others." We feel, when there is a thorough understanding of cavity preparation as given by Black, there will not be the need of modifying this system.

21. In what material do students prepare cavities for technic fillings?

Bone, 13; ivory, 6; Wenker form, 4; celluloid, 4; natural teeth, 19; typodont, 9; modeling compound, 2; plaster, 11. Many schools use more than one material for cavity preparation, which accounts

for the total number of replies exceeding the number of schools. For example, bone and plaster, or plaster and natural teeth, are used in some schools, and each one was counted separately.

22. How many technic cavities are required in each year?
    Freshman, 6 to 38; junior, 4 to 38.
23. Are the students allowed to use the engine in the freshman year? Is the revolving engine head bit used?
    First part, 23 no, 16 yes, 6 unanswered. Second part, 18 no, 10 yes, 17 unanswered.
24. How many hours are devoted to filling materials in the operative technic course, lectures, quizzes and laboratory?
    Scattered replies.
25. How many hours are devoted to the study of treatment and filling of root canals in the technic course, lectures, quizzes and laboratory?
    Scattered replies.
26. State anything else included in the operative technic course?
    1. Rubber dam application,
    2. Separation,
    3. Removal of deposits,
    4. Prophylaxis and pyorrhea technic,
    5. Gold inlays,
    6. Enlarging canals,
    7. Capping pulps,
    8. Inlay cavities filled with wax,
    9. Examination of root canal fillings,
    10. Lectures on facial morphology,
    11. Modeling in clay,
    12. Outline of roots from models of mouth,
    13. Preparing cavities in two plaster models set in a base to give contact to fillings of modeling compound when placed.
27. What texts are used in the operative technic course?
    Black, 12; Weeks, 3; Davis, 1; Kirk, 1; McGehee, 1; none, 5; unanswered, 6; none printed, 2; Black and Johnson, 4; Black, Johnson American System of Dentistry, American Text-Book of Dentistry, and Marshall, 1; Black and Buckley, 1; Black and Kirk, 1; Kirk, Johnson, Black and Marshall, 1; Broomell and Johnson, 1; Weeks and Black, 1; Noyes and American Text-Book of Dentistry, 1; Broomell, Johnson and Kirk, 1.

If the members of this body of teachers and their teachers of this subject will consider this matter during the coming year, it may be possible to agree upon some outline of work to be made up for guidance in the teaching of operative technics in the schools in the various sections of this country and Canada. Not to limit any individual school or instructor in their teaching or their individuality in teaching the subject, but in order that students will receive more equal and uniform

instruction and will be better qualified to pass examinations of State boards of examiners regardless of where they must graduate.

W. H. O. McGehee,
J. S. Ashbrooke,
E. D. Coolidge, *Chairman.*

DISCUSSION.

Dr. Fred W. Gethro, Chicago

I regret more than any one else that the hour is late and that, therefore, I can take little time to discuss this report, because I believe it is worthy of very extensive discussion. Dr. Coolidge is always thorough in his methods, and I know he has been put to a great amount of work in order to present this detailed report. I have some knowledge of this, because, as many of you will perhaps remember, three years ago I tried to conduct something along similar lines, taking in simply dental anatomy.

First—I would call attention to the second question sent out: "How many hours are devoted to lectures?" The variation between 16 hours and 192 hours shows that there is a lack of balance in our teaching. Certainly if one school utilizes for its lectures in this department only 16 hours, while the other school devotes as much as 192 hours to them, one or the other is very, very wrong in its methods.

Second—"The number of hours given to laboratory teaching." If one school is devoting 576 hours to laboratory work, it is my opinion that it is doing altogether too much laboratory work and not enough studying.

Third—Question 6: "Does the teacher in dental anatomy include the anatomy of the maxilla and mandible and all the associated parts?" I desire to differ with Dr. Coolidge just a little as to his deductions or recommendations made in that respect. Because a very few of these, only 7, answer "Yes," and 36 "No," Dr. Coolidge seems to feel that there is sufficient ground for not recommending the teaching of these. Now, I believe the teaching of the associated parts comes in very closely and should be included, notwithstanding the fact that I am not teaching these; but this is primarily due to the fact that I have not sufficient time on the schedule. If I had some of the valuable hours that some of the schools seem to put in the laboratories I would be very glad to take away some of

those and add the time to the lecture period. But as our schedule now stands, it is simply impossible to add more to some other parts without taking away from some of the subjects which we feel are entitled to that time.

I am particularly pleased to note that there has been a great improvement in even the three years that have elapsed since my report on the findings of the schools in reference to dental anatomy. I find that, instead of 15 schools using a certain method that we believe to be good, the number has increased to something like 33. And this shows that our instruction is becoming more or less standardized.

Fourth—With regard to question 10, which has reference to the materials used for carving teeth, I am also glad to note that more schools are employing ivory blocks, and am equally glad to note that fewer are using plaster. The use of the ivory or bone blocks or something similar is, to my mind, a decided advantage, and I believe that, on general principles, the use of plaster for such work should be discouraged because I can not believe that the student is able to get as much benefit in working on plaster as on the harder substances. And that is especially true when it comes to cavity preparation. I think of all materials used in cavity preparation, the student gets the least from plaster. We have frequently, at these meetings, had opportunity to inspect models prepared in plaster of Paris, and in a given size some of them will vary one, two or three times as to their depth in that particular tooth. There is nothing to mark the depth of the enamel, there is nothing to mark the dento-enamel junction, hence cavities in this material do not convey to the student the idea of depth. Some will have cavities in these models that would be deep enough to pass into the pulp-chamber, while others are so shallow that they would not reach through the enamel. Therefore, I say that I believe the work on these plaster models should be discouraged. And in that particular line I would advocate very strongly the preparing of cavities in natural teeth. I know there is a disposition on the part of many to believe that this is quite impossible, the belief being based upon the assumption that to obtain a sufficient number of natural teeth is out of the question. This is not true. It does require quite a little extra effort on the part of the teacher and demonstrators to compel the students to find natural teeth for cavity prepara-

tion. But if we hold them to it we find that they do. Our students in the Northwestern prepare all of their cavities, with the exception of a very few, which are intended for filling with gold foil, in natural teeth, and these cavities are filled with amalgam. Students are instructed in the catalogues that they will need a number of these teeth, and they are told to keep them in some moist substance, so they will not dry and check easily during the process of cavity preparation. And by keeping after them continually they are enabled to procure enough teeth for their use.

I wish to speak for a moment on the subject of instruments. I am sorry to note that there are not more colleges making instruments. And the material that I would strongly recommend for this purpose is one of the softer materials, such as brass. I do not believe in using much of the students' time in filing in steel. I realize and know that he should have some instruction in the making of steel instruments, so that he may know how to make a steel instrument and temper it, but not to spend time for this which could be much better spent in other things. I want him to learn the various sizes of instruments and to be so trained that he can accurately measure with his eye possibly up to 1-125th part of an inch, and it is not impossible for some of our students to measure accurately to 1-250th part of an inch, which is practically 1-10th of a millimeter. Many of our students who are making 48 instruments in brass, will measure accurately with the eye this very minute distance, simply because educated to do so. In this work we do not ask them to reproduce a steel instrument form, because very few of the steel instruments are made accurately according to formula, but instead they are required to make them accurately to their gauge. Therefore, I feel strongly upon the question of the brass instrument. Only the blade and the angles are considered, not the handle. I do not believe that the ordinary student spends ten minutes upon the handle portion of all these 48 instruments. I use a wire that is small enough so that it is an average size. I would hesitate about having a size that is sufficiently large so that it would require much filing, even to make the blade.

I desire to compliment the Association upon the report it has received, and to thank Dr. Coolidge for the excellent presentation which he has made of this subject.

Dr. D. M. Cattell, Memphis.

I wish to compliment Dr. Coolidge upon the work that he has done. If the Commission is continued for another year —which I sincerely hope it will be, for it has only begun its labors—the work of the Commission should go a little farther than the present one has been able to carry it.

There are many points in the report upon which I would like to comment, but I will not undertake it at this time. We will go straight to the matter of instrument-technology, which is the term I prefer, rather than instrumentology. I differ somewhat with Dr. Gethro, the previous speaker, in his idea. To make a long story short, there is no work in the technic department that the boys enjoy so much as that of making instruments, and in that alone it is encouraging. There is much of the work in the school which they do not enjoy, so let us give them something that will brighten their faces.

Again, I want them to do enough work in steel to know the feel of it, to know the hardness of it—the softness of it, to know how to file it, to know how to bend it without breaking, to know how to "draw" the temper, reduce it from a high temper to a low one, how to put it back to the high temper again—the brittle temper, drawing it again sufficiently to make a point that we can "whet" or sharpen, and that will cut. We get from the steel what Dr. Gethro gets from the small brass wire, and very much more, and we get it all in the making of instruments, instead of using steel in other ways to secure the experience in tempering that he speaks of.

In this I am talking from experience, having tried it out in many ways, first with the small wire, such as Dr. Gethro uses, increasing the size until finally the hexagonal wire was used of a size sufficiently large that the student could whittle out the desired forms, then using steel, just a plain steel hexagonal or octagonal rod, and having students whittle out the shank and form the instrument. Finally, reaching the place where the shank itself was made or "turned" before delivery to the student, so that he has the complete instrument except for the working point. He gets all the experience necessary in simply making the point—shaping, tempering and sharpening it. And finally the instrument he has made is used in the preparation of from four to six cavities in odontotypes, or

carved forms. All this is done in the junior year, the instrument being blocked out, formed and partially polished in the freshman year, then laid by till the junior year, when it is taken up during the first of the term and finished. Then the student takes the blocks or odontotypes which have been carved to tooth forms the year before, and carves in these certain cavities of definite dimensions, the exact dimensions in every way being given to the class or written on the board, said cavities being formed with the instruments that the student himself has worked out. It is the only place where the student is allowed to work with a "technic instrument." And I say that the pleasure the student has in making these instruments is worth a great deal. Where a student body is working in a laboratory three hours a day for three days in the week, they get very tired of many things, but less tired in this than in anything that I have had experience with.

The report of this Commission, as has been mentioned several times, is not entirely satisfactory. I mean that the time in which to discuss the report is not sufficient. This number of the program has been relegated to the closing hours of the last session, as well as the report of the Master of Exhibits, and it is not fair. It was decided two or three years ago that it was time we were talking technics again, and yet we have not had a fair opportunity for this. And I am sorry that the suggestion did not prevail that the report of this Commission, as well as that of the Commission on Prosthetic Technics and, also, of the Commission on Nomenclature should be taken up early in the session instead of at its close.

A word about the letters that have been sent out by members of the Commission and others. I have heard recently of three different letters having been sent to our school, pertaining to my department, that I declare I never saw and never heard of before. Now, let us talk plainly about this. There are some schools in which the dean takes care of all the correspondence. In these schools, therefore, it is the dean that should be written to. There are other schools in which the secretary or registrar takes care of the correspondence, and in that case he is the man to whom letters should be addressed. In others, again, it may be the individual instructors. But, however this may be, there should be some way devised whereby the writer, whoever he may be, may know to whom

he should write in every instance. I know that many letters come to our school directed to the dean (whose office is downtown), concerning my department, which I never see or hear of until we get a rap over the shoulder from somewhere because we have not answered a letter. The dean of our school does not do any of the correspondence unless forced to do it, and so any school or committee or commission, whatever it may be, is hampered if anything is desired of us, simply because the communication has been sent to the dean instead of to the registrar. Oh, I have whanged away at the dean about this, I have talked more plainly to him than I am talking here, but men are so constituted, and I know that many other deans are in the same boat.

It seems to me that there should be some way to remedy this. When I was, for several years, chairman of the Executive Board, early in the work of this Institute, I remember that I wrote out the names of the deans of each college and the names of the teachers in that school to whom communications in regard to technics in the various departments should be addressed. In this way I was informed as to the name of the man most interested in any one of these departments and who would, therefore, be likely to attend to the correspondence when he received letters pertaining to it.

Again, as to the list of questions which went out from the commission. Some of these questions, I am sure, we did not altogether understand, hence the replies were not very satisfactory. I remember a set of questions which I, on one occasion, received from some one, I do not remember who, many of which were so badly put that I did not know what was desired in the way of reply. So when such questions go out, due consideration should be given to their formation. They should be made so plain that even the dullest of the deans or registrars may understand them.

In connection with this subject, I feel very strongly that the Institute has not quite done its duty to the freshmen and junior boys. I believe that operative dentistry should be taught in the freshman and junior years, and that the clinic of the infirmary should operate to the benefit of the dental student the same as the hospital operates to the benefit of the medical student; the latter goes to the hospital after he has learned things, and so the dental student should go to the

infirmary after he has learned the technical part of operative dentistry.

Dr. H. M. Semans, Columbus.

We all recognize the fact that this report of the Commission on Operative Technics is almost entirely statistical, and I think that was the intention last year. As you have learned from the preceding speakers, there is no doubt but that the extension and continuation of the Commission is absolutely necessary. The fact of the matter is, Dr. Smith's idea of a symposium or a commission in these two departments was doubtless that they should be of a permanent nature, perhaps to carry out the very object of which Dr. Cattell spoke four or five years ago, when he remarked that we had departed somewhat from the purpose as planned when the Institute was established. So, while we have, through the report of this Commission, a very splendid statistical presentation of the subject, I believe that this feature has been so well worked out that the Commission will warrant its continuation for other purposes besides statistics. I believe we should, in this respect, go back to the ground we occupied fifteen or eighteen years ago and ask, not only that the Commission shall report from a statistical standpoint and perhaps present to us in a general way ideas leading to the teaching of this department by principles, but also that it shall again present methods.

It is very interesting to note, as we read down through the report presented, those answers which are so sparing as to indicate the feeling on the part of the writers of said answers that the subjects are entirely too burdensome or too uninteresting to report upon. That, in itself, shows that we have the need of these two Commissions whose reports shall, at least for a long time to come, form an annual part of the proceedings of our Institute.

Dr. W. C. Davis, Lincoln, Neb.

The whole system of dental education is in such a condition that finally, with many other matters of importance before us, we are about to be examined by a commission connected with dental schools, and then by one not connected with dental schools. And we have found, too, through the presentation of the reports of these commissions, that our teaching in these two subjects is in a state of chaos.

Every member of our faculties is a member of this Institute in good standing, and we have four hundred teachers. Two hundred of those men do not know that they are eligible to the floor and members of this Institute as much as you or I, and are taking no interest.

To remedy, so far as possible, these conditions, I would suggest this: That this body divide itself into sections, these sections to represent the various subjects on our curricula. For example, one section representing anatomy in general, one representing dental anatomy, another histology, and so on through the entire schedule. There should be appointed in the Institute committees representing the various branches, each one of these committees to consist of three men who are engaged in teaching the particular subject represented by the committee, and to have a chairman. Then these committees or sections in this body shall secure the names of all the men who are teaching the subject at home—don't forget the dear boys at home are teaching and that have never attended this Institute. They haven't the enthusiasm they would have if they were here.

Take, for instance, the subject of dental histology. We will say there is a committee of three men who are generally in attendance at the meeting, and its officers shall consist of a chairman, vice chairman, and secretary, and the business of the latter shall be to correspond with the fifty odd teachers of dental histology, advising them, we will say, that it is the duty of the members of that section to, as far as possible, attend the meetings of this Institute. Then the Institute itself can take up with that section this very work—not with the deans of the schools, but corresponding directly with the secretary of this section, asking, first, how much floor space the teachers of his branch have, how many desks, how many lockers, how many microscopes, lectures, quiz hours, specimens prepared by students or otherwise—everything possible about the subject. Then the secretary of that committee or section is to bring his report in here and strike an average, promising each professor that a report (off the mimeograph) will be sent back to him giving an average in the whole subject.

The trouble is that teachers do not, as a rule, take sufficient interest. If we had some fifteen committees of that kind, each one following up its subject and whipping the

teachers into line, we would have a unification of schedule, we would have a correct syllabus, we would have a system of text-books that would be more uniform, and there would be increased interest in our proceedings. The work would then be blocked out in a plan which would make this Institute of real service if each one would do his part in seeking to standardize his subject. The work is too extensive for one man to direct. We have attempted, in this Institute, to have a Commission, whose duty it should be to bring about a unification of schedule. I say that work is too big for any three men unless they were on a salary. But if a man were interested only in his own section and looked after that and tried to bring it up to the standard, then we would have better results and more concerted action. And I believe we would not then have such great variation in the number of hours of teaching—some men with over 100 hours wasting time, while the man with 16 hours is behind and should come up.

Can't we get eighteen or twenty men in our own faculties who will be as much interested in this organization of teachers as you or I?

Dr. Coolidge (closing the discussion). To a great extent Dr. Davis is correct, but there will still arise the difficulty that we have had expressed in the discussion. Two splendid ideas have been given which are diametrically opposed to each other. We must agree among ourselves that we are going to be molded and influenced by what is done by a majority, or by what seems to be the most advisable method of teaching.

In regard to the suggestion that we send this report to each teacher: If we were to send this report to a man teaching 16 hours, he would still feel that he was teaching enough, unless he were to get the benefit of the discussion. It is not possible for these men always to be here. I do not believe that there is sufficient emphasis put on the proceedings of this Institute. I believe the best place in which to get men interested in these things is to talk about them in the faculty meetings. We should send a printed copy of this report to each man individually, stating that we do so because it applies to his department, but I believe this will not be necessary if we take the book of proceedings in the faculty room and say, "Here is something I want you to look at, for it applies to your

department." In that way the difficulty would be overcome without sending out the separate pamphlet.

But the important thing, the thing we should do, is to get together. The statistics that we have are absolutely valueless unless we are willing to be influenced by them. We have had expressed here two or three entirely different views of teaching, each of which is good, neither one is wrong. But if we will ever benefit by our deliberations here we will have to draw together on these different views. We shall have to decide which is the most important thing and eliminate the other. There is one teacher whose answer is included in the report who teaches operative technics for one month only, leaving the required work entirely to the ability of the student. He may finish in a week, if able to do this work in accordance with the standards employed. If he shows some ability in cavity preparation he can go at once to the infirmary. Yet that school is a prominent one—I do not know whether it has a representative here this year or not. The members of its faculty are absolutely satisfied with their way of teaching. If that is right, then we must do the same thing; if they give a better course in one week or one month's time than we in a year's time, we should pattern after them.

So we must get together on this matter. It is the thing we heard expressed last night—we must get together on all these questions. Dr. Downing, the Commissioner of Education, said last night that the State Board of Dental Examiners of the State of New York was going to get out a syllabus to use in the schools. If the New York State Board of Dental Examiners gets out a model by which we are to teach, it would seem to me to reflect great discredit upon this American Institute of Dental Teachers.

I say the State Board of Dental Examiners ought to come to us and find out what they should examine on. I do not wish in any way to show disrespect to the State Board of Dental Examiners of New York or any other State. They are intelligent and capable men, and entitled by education and training to hold the position they do in the various State boards, and in many instances are as capable of teaching a subject as are the teachers, but the teachers should know what the student ought to learn. We should work hand in hand with the Commissioner of Education and with the Dental Examiners, but we should make our own outline of the work

(not a syllabus), we should submit it to them to get their approval of it, and then see that all our schools live up to it. The State Board examination that is required in the different States should help us to make the schools live up to such an outline.

Dr. Ellison Hillyer: I think there is a misunderstanding in regard to that. If I remember correctly, Dr. Downing distinctly said that the syllabi were to be referred to the colleges for their consideration, thence back to the examiners.

Dr. Coolidge: Yes, I understand that.

Dr. Hillyer: Practically, then, we would be doing as you suggest.

Dr. Coolidge: But we should be the ones to inaugurate it.

Dr. Hillyer: Certainly.

Dr. Coolidge: But they are going to force us to it, and I think we should do it before we are forced. I do think we should have an outline, and then abide by that outline.

I want to take this occasion to thank the other members of the Commission who have helped me so kindly. Drs. McGehee and Ashbrook have helped me most willingly in this work. We have gone over it together, and we have, I trust, made a step in advance in this line of work.

REPORT OF MASTER OF EXHIBITS.

The schools presenting an exhibit at this meeting are:

Vanderbilt University, Department of Dentistry.
Louisville College of Dentistry.
Royal College of Dental Surgeons.
Chicago College of Dental Surgery.
University of Michigan, College of Dental Surgery.
Ohio College of Dental Surgery.
University of Buffalo, Dental Department.
University of Pennsylvania, School of Dentistry.
Philadelphia Dental College.
Starling-Ohio Medical College, Department of Dentistry.
University of Pittsburgh, School of Dentistry.
New York College of Dentistry.
University of Southern California, College of Dentistry.
Colorado College of Dental Surgery.
Georgetown University, Dental Department.
University of Tennessee, College of Dentistry.
McGill University, Department of Dentistry.

The following schools did not respond to the invitation to exhibit:

College of Dentistry, University of Minnesota.
University of Iowa, College of Dentistry.
College of Dental and Oral Surgery, New York.
Creighton University, College of Dentistry.
Texas Dental College.
Meharry Dental College.
Western Dental College.
George Washington University, Department of Dentistry.

The majority of the schools were unable to make an exhibit this year, and while some had very good excuses, others did not. The principal excuse seems to be the lack of having anything new to exhibit.

It is impossible to change from the standardized method of the technic work, but each school carries out these methods in a different manner and such variety of procedure, may be of particular interest to some others. The school which thinks that it has nothing new to exhibit must remember that, while it may appear old to itself, a great many other schools might find it interesting to them. Another view of this is that many exhibits are shown in such a way that they create no unusual interest, and yet, if these same were so arranged as to be attractive, as well as instructive, the lack of appreciation might not be so apparent.

The response to the request for exhibits this year was very good as compared with previous years.

Forty replies were received from the forty-six schools, twenty in the affirmative, and only ten of these agreed to prepare a special exhibit of prosthetic technic.

The Master of Exhibits desired to present a special exhibit of prosthetic technic from every school of the Institute. Each was requested to mount the complete prosthetic technic requirements of a single student on black cardboard, with its corresponding portion of the roster, arranged in the order in which it was made and with the name of the school at the top of the card.

The lack of co-operation for this special exhibit was evident in the absence of all but one such display, and, in view of this apathy, the suggestion is made to the Institute

that this subject of special exhibits be considered and that the decision for such be made for next year's meeting.

Your Master of Exhibits thanks the schools contributing. A special credit is due the Royal College of Dental Surgeons which, in spite of the customs, brought a very large and magnificent exhibit of their teaching models.

Respectfully submitted,

CECIL O. BOOTH,
E. S. PACKWOOD.

APPENDIX.

CONSTITUTION AND BY-LAWS.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

FORMERLY

INSTITUTE OF DENTAL PEDAGOGICS.

Organized at The World's Columbian Dental Congress, Chicago, 1893.

REVISED CONSTITUTION AND BY-LAWS.

ARTICLE I.

Name and Object.

Section 1. This association shall be known as the "American Institute of Dental Teachers."

SEC. 2. Its object shall be the improvement of the educational department of the colleges comprising its membership, by interchange of thought and formulation of methods.

ARTICLE II.

OFFICERS AND STANDING COMMITTEE.

SECTION 1. The officers shall be a President, Vice-President and Secretary-Treasurer, the same to be selected from the active members and elected by a majority ballot at the annual meeting.

SEC. 2. There shall be one standing committee of three members, which shall be known as the Executive Board, the same to be elected by a majority ballot at the annual meeting.

SEC. 3. The Executive Board shall be elected and serve as follows: At each annual meeting there shall be one member elected to serve for three years.

ARTICLE III.

MEETINGS AND QUORUM.

SECTION 1. The regular meeting shall be held at such time and place as may be decided upon by the Executive Board.

SEC. 2. On the written application of the representatives of seven colleges the President may, on thirty days' notice, call special meetings to be held at such places as may be most convenient.

SEC. 3. Representatives from ten colleges shall constitute a quorum.

ARTICLE IV.

MEMBERS AND DUES.

SECTION 1. Any college in the United States or Canada which complies fully with all the requirements of the National Association of Dental Faculties as regards educational standards, is eligible to apply for membership in this body.

SEC. 2. Active members shall consist of accredited representatives from the teaching staff of the colleges holding membership.

SEC. 3. Each college holding membership in this body may be represented by one or more of its teaching staff as its representatives, and such representatives shall be entitled to all the privileges of the Institute, *except that no college shall cast more than one vote on any matter acted on by the Institute.*

SEC. 4. Any teacher having been an accredited delegate to this body for three or more years from a school in good standing, may, in the event of withdrawing from the faculty, of such school, be made a permanent member —without vote—by a two-thirds affirmative vote of the members present.

SEC. 5. The annual dues shall be twenty dollars ($20.00) from each college, payable in advance. *The dues of a college must be paid before its representative can take part in the proceedings of the Institute.*

ARTICLE V.

APPLICATIONS FOR MEMBERSHIP.

SECTION 1. Applications for membership shall be presented in writing at any annual meeting. This shall be referred to the Executive Board.

SEC. 2. A favorable report from the Executive Board followed by a favorable vote of two-thirds of the voting representatives present, is necessary to elect the applicant to membership.

ARTICLE VI.

FUNDS.

SECTION 1. All funds shall be applied to the necessary expense of the Institute and shall be paid out by the Secretary-Treasurer as ordered or as bills are approved by two members of the Executive Board.

ARTICLE VII.

ALTERATIONS AND AMENDMENTS.

SECTION 1. Any amendment to the Constitution or By-Laws shall be proposed in writing at a regular meeting. It shall lie over until the next annual meeting and every active member shall be notified of such proposed amendment, when it may be adopted by an affirmative vote of two-thirds of the active members present.

ARTICLE VIII.

Section 1. Roberts' Rules of Order shall be the authority governing this body.

BY-LAWS.

ARTICLE I.

DUTIES OF OFFICERS.

SECTION 1. The duties of the President and Vice-President shall be such as usually pertain to these offices in similar organizations.

SEC. 2. The duties of the Secretary-Treasurer shall be such as pertain to the office of Secretary and Treasurer in similar organizations.

SEC. 3. The President and Secretary-Treasurer shall render an annual report.

ARTICLE II.

DUTIES OF EXECUTIVE BOARD.

SECTION 1. The Executive Board shall receive and act upon all applications for membership. It shall receive and act upon all bills presented to the Institute. It shall provide a program for each regular meeting, which shall be in the nature of papers, exhibits or reports from members upon the several topics pertaining to Dental Pedagogics.

SEC. 2. It shall attend to all business of the Institute and render an annual report of its transactions, which shall be published.

SEC. 3. It shall select the place for each meeting and provide the necessary arrangements.

ARTICLE III.

LOSS OF MEMBERSHIP.

SECTION 1. Any college that is in arrears for two years' dues shall be dropped from the roll.

SEC. 2. Any college dropped from the roll for the cause mentioned in Section 1 of this Article shall be required to pay all dues owing at the time it was dropped before it can be voted on for reinstatement.

ARTICLE IV.

MASTER OF EXHIBITS.

SECTION 1. At each annual meeting the Executive Board shall appoint a Master of Exhibits to serve until the close of the next annual meeting. He shall have full charge of the exhibits and shall make a report to the Institute.

SEC 2. The Master of Exhibits shall have power to appoint such assistants as he may deem necessary .

APPENDIX A.

MEMBERS IN ATTENDANCE.

(Taken from Secretary's Register.)

Dr. Thos. L. Gilmer, Northwestern University Dental School.
Dr. Chas. R. E. Koch, Northwestern University Dental School.
Dr. Arthur D. Black, Northwestern University Dental School.
Dr. Fred W. Gethro, Northwestern University Dental School.
Dr. G. W. Reynolds, College of Dentistry, University of Minnesota.
Dr. Henry W. Morgan, Vanderbilt University, Department of Dentistry.
Dr. J. H. Phillips, Vanderbilt University, Department of Dentistry.
Dr. W. E. Grant, Louisville College of Dentistry.
Dr. H. B. Tileston, Louisville College of Dentistry.
Dr. W. M. Randall, Louisville College of Dentistry.
Dr. J. B. Willmott, Royal College of Dental Surgeons.
Dr. W. E. Willmott, Royal College of Dental Surgeons.
Dr. A. E. Webster, Royal College of Dental Surgeons.
Dr. C. R. Minns, Royal College of Dental Surgeons.
Dr. A. J. McDonagh, Royal College of Dental Surgeons.
Dr. Guy G. Hume, Royal College of Dental Surgeons.
Dr. E. E. Bruce, Royal College of Dental Surgeons.
Dr. J. A. Bothwell, Royal College of Dental Surgeons.
Dr. C. A. Kennedy, Royal College of Dental Surgeons.
Dr. A. A. Stewart, Royal College of Dental Surgeons.
Dr. W. C. Smith, Royal College of Dental Surgeons.
Dr. W. H. Doherty, Royal College of Dental Surgeons.
Dr. Edward E. Belford, Western Reserve University, School of Dentistry.
Dr. J. Herbert Hood, Western Reserve University, School of Dentistry.
Dr. Samuel W. Allen, Western Reserve University, School of Dentistry.
Dr. W. S. Copeland, Chicago College of Dental Surgery.
Dr. J. E. Schaefer, Chicago College of Dental Surgery.
Dr. R. W. Bunting, University of Michigan, College of Dental Surgery.
Dr. Chalmers J. Lyons, University of Michigan, College of Dental Surgery.

Dr. F. P. Cole, University of Michigan, College of Dental Surgery.

Dr. A. J. Schroeder, University of Michigan, College of Dental Surgery.

Dr. H. T. Smith, Ohio College of Dental Surgery.

Dr. W. H. O. McGehee, Ohio College of Dental Surgery.

Dr. George E. Hunt, Indiana Dental College.

Dr. C. C. Allen, Kansas City Dental College.

Dr. D. H. Squire, University of Buffalo, Dental Department.

Dr. Eli H. Long, University of Buffalo, Dental Department.

Dr. L. M. Waugh, University of Buffalo, Dental Department.

Dr. A. Hoffmann, University of Buffalo, Dental Department.

Dr. John Oppie McCall, University of Buffalo, Dental Department.

Dr. Jas. B. Hicks, University of Buffalo, Dental Department.

Dr. E. S. Packwood, University of Buffalo, Dental Department.

Dr. G. F. Roberts, University of Buffalo, Dental Department.

Dr. John L. Garretson, University of Buffalo, Dental Department.

Dr. W. Ray Montgomery, University of Buffalo, Dental Department.

Dr. W. Burton Eshleman, University of Buffalo, Dental Department.

Dr. E. J. Farmer, University of Buffalo, Dental Department.

Dr. Thos. A. Hicks, University of Buffalo, Dental Department.

Dr. Guy M. Hughey, University of Buffalo, Dental Department.

Dr. H. W. Backus, University of Buffalo, Dental Department.

Dr. G. E. Jackson, University of Buffalo, Dental Department.

Dr. C. O. Sterlsing, University of Buffalo, Dental Department.

Dr. Guy M. Fiero, University of Buffalo, Dental Department.

Dr. Alfred P. Lee, University of Pennsylvania.

Dr. Robt. J. Seymour, University of Pennsylvania.

Dr. J. G. Lane, University of Pennsylvania.

Dr. Wm. C. Marsh, University of Pennsylvania.

Dr. Harry E. Kelsey, Baltimore College of Dental Surgery.

Dr. C. J. Grieves, Baltimore College of Dental Surgery.

Dr. B. Holly Smith, Baltimore College of Dental Surgery.

Dr. S. H. Guilford, Philadelphia Dental College.

Dr. John S. Owens, Philadelphia Dental College.

Dr. G. S. Junkerman, Cincinnati College of Dental Surgery.
Dr. J. P. Harper, St. Louis Dental College.
Dr. H. M. Semans, Ohio State University, College of Dentistry.
Dr. H. V. Cottrell, Ohio State University, College of Dentistry.
Dr. K. C. Brashear, Ohio State University, College of Dentistry.
Dr. Chas. E. Jones, Washington University, Dental Department.
Dr. H. E. Friesell, University of Pittsburgh, School of Dentistry.
Dr. O. L. Hertig, University of Pittsburgh, School of Dentistry.
Dr. H. S. Haslett, University of Pittsburgh, School of Dentistry.
Dr. J. S. Ashbrook, University of Pittsburgh, School of Dentistry.
Dr. F. C. Friesell, University of Pittsburgh, School of Dentistry.
Dr. J. F. Biddle, University of Pittsburgh, School of Dentistry.
Dr. C. O. Booth, University of Pittsburgh, School of Dentistry.
Dr. Leslie Waddill, University of Pittsburgh, School of Dentistry.
Dr. P. V. McParland, University of Pittsburgh, School of Dentistry.
Dr. L. W. Ohl, University of Pittsburgh, School of Dentistry.
Dr. A. M. Martin, University of Pittsburgh, School of Dentistry.
Dr. A. B. French, University of Pittsburgh, School of Dentistry.
Dr. Ellison Hillyer, New York College of Dentistry.
Dr. Alfred R. Starr, New York College of Dentistry.
Dr. Francis Leroy Satterlee, New York College of Dentistry.
Dr. H. Schweitzer, New York College of Dentistry.
Dr. F. B. Moorehead, University of Illinois, College of Dentistry.
Dr. Edgar D. Coolidge, University of Illinois, College of Dentistry.
Dr. A. G. Friedrichs, Toulane University, College of Dentistry.
Dr. William Carr, College of Dental and Oral Surgery, New York.

Dr. Herbert L. Wheeler, College of Dental and Oral Surgery, New York.
Dr. A. W. Starbuck, Colorado College of Dental Surgery.
Dr. E. A. Johnston, Tuft's College Dental School.
Dr. Jas. Keltic, Tuft's College Dental School.
Dr. Shirley W. Bowles, Georgetown University, Dental Department.
Dr. C. A. Hawley, Georgetown University, Dental Department.
Dr. I. N. Broomell, Medico-Chi. of Philadelphia, Department of Dentistry.
Dr. J. E. Nyce, Medico-Chi. of Philadelphia, Department of Dentistry.
Dr. Clyde W. Davis, Lincoln Dental College, University of Nebraska.
Dr. D. E. Morrow, Barnes Dental College.
Dr. Eudore Dubeau, Laval University, Dental Department.
Dr. Jos. Nolin, Laval University, Dental Department.
Dr. J. G. A. Gendreau, Laval University, Dental Department.
Dr. Thos. S. Larseneur, Laval University, Dental Department.
Dr. A. H. Hipple, Creighton University, College of Dentistry.
Dr. Richard L. Simpson, Medical College of Virginia, Dental Department.
Dr. J. A. C. Hoggan, Medical College of Virginia, Dental Department.
Dr. D. M. Cattell, University of Tennessee, College of Dentistry.
Dr. A. W. Thornton, McGill University, Department of Dentistry.
Dr. Fred G. Heary, McGill University, Department of Dentistry.
Dr. D. J. Berwick, McGill University, Department of Dentistry.
Dr. A. Clifford Jack, McGill University, Department of Dentistry.
Dr. T. O. Heatwole, University of Maryland, Dental Department.
Dr. Alex. H. Paterson, University of Maryland. Dental Department.
Dr. E. E. Curzon, University of Maryland, Dental Department.

Dr. S. W. Farinholt, University of Maryland, Dental Department.
Dr. E. W. Neil, Meharry Dental College.
Dr. H. B. McMillen, Western Dental College.
Dr. W. F. Lawrence, George Washington University, Department of Dentistry.
Dr. Herbert C. Miller, North Pacific College of Dentistry.

GUESTS.

Dr. J. Leon Williams, London, England.
Dr. Augustus S. Downing, Assistant Commissioner of Education, New York.
Dr. A. W. Jarman, Post-Graduate School of Dentistry of Philadelphia.
Dr. Thos. Morfflew, San Francisco, College of Physicians and Surgeons.
Dr. R. Ottolengui, New York City.
Dr. Frederic Eyer, Rio Janeiro, Brazil.
Dr. W. W. Smith, Rochester, N. Y.
Dr. Frank A. Gough, Brooklyn, N. Y.
Dr. H. J. Burkhart, Batavia, N. Y.
Dr. A. R. Cooke, Syracuse, N. Y.
Dr. W. C. Deane, New York City.
Dr. O. J. Gross, Schenectady, N. Y.
Dr. E. G. Parker, Goshen, N. Y.
Dr. F. C. Walker, Brooklyn, N. Y.
Dr. W. A. White, Phelps, N. Y.
Dr. A. M. Wright, Troy, N. Y.

APPENDIX B.

MEMBERSHIP COLLEGES WITH REPRESENTATIVES PRESENT.

Northwestern University Dental School.
College of Dentistry, University of Minnesota.
Vanderbilt University, Department of Dentistry.
Louisville College of Dentistry.
Royal College of Dental Surgeons.
Western Reserve University, School of Dentistry.
Chicago College of Dental Surgery.
University of Michigan, College of Dental Surgery.
Ohio College of Dental Surgery.
Indiana Dental College.
Kansas City Dental College.

University of Buffalo, Dental Department.
University of Pennsylvania, School of Dentistry.
Baltimore College of Dental Surgery.
Philadelphia Dental College.
Cincinnati College of Dental Surgery.
St. Louis Dental College.
Ohio State University, College of Dentistry.
Washington University, Dental Department.
University of Pittsburgh, School of Dentistry.
New York College of Dentistry.
University of Illinois, College of Dentistry.
Tulane University, College of Dentistry.
College of Dental and Oral Surgery, New York.
Colorado College of Dental Surgery.
Tufts College Dental School.
Georgetown University, Dental Department.
Medico-Chi. of Philahelphia, Department of Dentistry.
Lincoln Dental College, University of Nebraska.
Barnes Dental College.
Laval University, Dental Department.
Creighton University, College of Dentistry.
Medical College of Virginia, Dental Department.
University of Tennessee, College of Dentistry.
McGill University, Department of Dentistry.
University of Maryland, Dental Department.
Meharry Dental College.
Western Dental College.
George Washington University, Department of Dentistry.
North Pacific College of Dentistry.

APPENDIX C.

MEMBERSHIP COLLEGES NOT REPRESENTED.

University of California, College of Dentistry.
University of Iowa, College of Dentistry.
University of Southern California, College of Dentistry.
Howard University, Dental Department.
Texas Dental College.
Dalhousie University, Faculty of Dentistry.
Harvard University Dental School.

OFFICERS AND COMMITTEES FOR THE ENSUING YEAR.

President.

DR. FRED W. GETHRO, 1527 Peoples Gas Building, Chicago, Ill.

Vice-President.

DR. H. M. SEMANS, Columbus, Ohio.

Secretary-Treasurer.

DR. JOHN F. BIDDLE, 517 Arch Street, N. S., Pittsburgh, Pa.

Executive Board.

DR. SHIRLEY W. BOWLES, 1616 I Street, Washington, D. C.
DR. A. W. THORNTON, Montreal, Canada.
DR. R. W. BUNTING, Ann Arbor, Mich.

Local Committee of Arrangements.

DR. L. P. HALL, Ann Arbor, Mich.
DR. E. T. LOEFFLER, Ann Arbor, Mich.
DR. E. L. WHITMAN, Ann Arbor, Mich.

Master of Exhibits.

DR. EARL S. PACKWOOD, 1370 Main Street, Buffalo, N. Y.

Assistant.

DR. M. L. WARD, Ann Arbor, Mich.

Commission on Nomenclature.

DR. F. B. MOORHEAD, 1470 Peoples Gas Building, Chicago, Ill.
DR. S. H. GUILFORD, Philadelphia, Pa.
DR. A. H. HIPPLE, Omaha, Neb.

Commission on Text-Books.

DR. ELLISON HILLYER, 1143 Dean Street, Brooklyn, N. Y.
DR. A. E. WEBSTER, Toronto, Canada.
DR. C. J. GRIEVES, Baltimore, Md.

Commission on Operative Technics.

DR. EDGAR D. COOLIDGE, 59 East Madison Street, Chicago, Ill.
DR. W. H. O. MCGEHEE, Cincinnati, Ohio.
DR. J. S. ASHBROOK, Pittsburgh, Pa.

Commission on Prothetic Technics.

DR. W. E. WILLMOTT, 96 College Street, Toronto, Canada.
DR. H. V. COTTRELL, Columbus, Ohio.
DR. N. S. HOFF, Ann, Arbor, Mich.

LIST OF DENTAL COLLEGES

MEMBERS OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

The following list of Dental Colleges, together with their respective Deans, is given in the order in which the Colleges joined the Institute.

Year of Admission.	School.	Dean.	City.
1. 1894	Northwestern University, Dental School	Dr. G. V. Black	Chicago
2. 1894	College of Dentistry, University of Minnesota	Dr. Alfred Owre	Minneapolis
3. 1894	Vanderbilt University, Department of Dentistry	Dr. Henry W. Morgan	Nashville
4. 1894	Louisville College of Dentistry	Dr. William E. Grant	Louisville
5. 1894	Royal College of Dental Surgeons	Dr. J. B. Willmott	Toronto
6. 1894	Western Reserve University, School of Dentistry	Dr. Edward E. Belford	Cleveland
7. 1894	Chicago College of Dental Surgery	Dr. Truman W. Brophy	Chicago
8. 1894	University of Michigan, College of Dental Surgery	Dr. N. S. Hoff	Ann Arbor
9. 1894	Ohio College of Dental Surgery	Dr. H. T. Smith	Cincinnati
10. 1894	University of California, College of Dentistry	Dr. James G. Sharp	San Francisco
11. 1895	University of Iowa, College of Dentistry	Dr. F. T. Breen	Iowa City
12. 1895	Indiana Dental College	Dr. George E. Hunt	Indianapolis
13. 1895	Kansas City Dental College	Dr. J. D. Patterson	Kansas City
14. 1895	University of Buffalo, Dental Department	Dr. D. H. Squire	Buffalo
15. 1895	University of Pennsylvania, School of Dentistry	Dr. E. C. Kirk	Philadelphia
16. 1896	Baltimore College of Dental Surgery	Dr. M. W. Foster	Baltimore
17. 1896	Philadelphia Dental College	Dr. S. H. Guilford	Philadelphia
18. 1896	Cincinnati College of Dental Surgery	Dr. G. S. Junkerman	Cincinnati
19. 1896	St. Louis Dental College	Dr. J. P. Harper	St. Louis
20. 1897	Ohio State University, College of Dentistry	Dr. H. M. Semans	Columbus
21. 1897	Washington University, Dental Department	Dr. J. H. Kennerly	St. Louis
22. 1898	University of Pittsburgh, School of Dentistry	Dr. H. E. Friesell	Pittsburgh
23. 1898	New York College of Dentistry	Dr. F. D. Weisse	New York City
24. 1900	University of Illinois, College of Dentistry	Dr. F. B. Moorehead	Chicago
25. 1901	Tulane University, College of Dentistry	Dr. A. G. Friedrichs	New Orleans
26. 1903	College of Dental and Oral Surgery, New York	Dr. William Carr	New York City
27. 1903	University of Southern California, College of Dentistry	Dr. Lewis E. Ford	Los Angeles
28. 1903	Howard University, Dental Department	Dr. Edward A. Balloch	Washington, D. C
29. 1903	Colorado College of Dental Surgery	Dr. W. T. Chambers	Denver
30. 1903	Tufts College Dental School	Dr. C. F. Painter	Boston
31. 1905	Georgetown University, Dental Department	Dr. Shirley W. Bowles	Washington, D. C.
32. 1905	Medico-Chi. of Philadelphia, Department of Dentistry	Dr. I. N. Broomell	Philadelphia
33. 1907	Lincoln Dental College, University of Nebraska	Dr. W. Clyde Davis	Lincoln, Neb.

	Year of Admission.	School.	Dean.	City.
34.	1909—	Barnes Dental College	Dr. George H. Owen	St. Louis
35.	1909—	Laval University, Dental Department	Dr. Eudore Dubeau	Montreal
36.	1910—	Creighton University, College of Dentistry	Dr. A. H. Hipple	Omaha
37.	1911—	Medical College of Virginia, Dental Department	Dr. R. L. Simpson	Richmond
38.	1911—	University of Tennessee, College of Dentistry	Dr. J. A. Gardner	Memphis
39.	1911—	Texas Dental College	Dr. O. F. Gambati	Houston
40.	1911—	McGill University, Department of Dentistry	Dr. A. W. Thornton	Montreal
41.	1911—	University of Maryland, Dental Department	Dr. T. O. Heatwole	Baltimore
42.	1912—	Meharry Dental College	Dr. G. W. Hubbard	Nashville
43.	1912—	Dalhousie University, Faculty of Dentistry	Dr. Frank Woodbury	Halifax, N. S.
44.	1912—	Harvard University Dental School	Dr. Eugene Smith	Boston
45.	1913—	Western Dental College	Dr. William J. Brady	Kansas City
46.	1913—	George Washington University, Department of Dentistry	Dr. J. Roland Walton	Washington, D. C.
47.	1913—	North Pacific College of Dentistry	Dr. Herbert C. Miller	Portland

*INSTITUTE MEMBERS.

CHICAGO, ILL.

Northwestern University Dental School.

Drs.	G. V. Black	31 West Lake St.
	Thomas L. Gilmer	Peoples Gas Bldg.
	Edmund Noyes	Stewart Bldg.
	J. H. Prothero	31 West Lake St.
	T. B. Wiggin	Reliance Bldg.
	I. B. Sellery	Venetian Bldg.
	H. M. Gordin	31 West Lake St.
	A. D. Black	Peoples Gas Bldg.
	E. S. Willard	31 West Lake St.
	Fred W. Gethro	Peoples Gas Bldg.
	H. I. Van Tuyl	1218 East Sixty-third St.
	H. A. Potts	31 North State St.
	C. R. E. Koch	31 West Lake St.
	George C. Poundstone	2605 Milwaukee Ave.
	H. T. Brown	6057 Calumet Ave.
	Joseph Eisenstaedt	5 North Wabash Ave.
	George A. Dorsey	Field Museum of Natural History.
	C. F. B. Stowell	Venetian Bldg.

MINNEAPOLIS, MINN.

University of Minnesota, College of Dentistry.

Drs.	Alfred Owre	2109 Blaisdell Ave.
	R. O. Beard	The Virginia, Lowry Hill.
	Thomas G. Lee	509 East River Road.
	Thomas B. Hartzell	716 Donaldson Bldg.
	George B. Frankforter	525 East River Road.
	O. A. Weiss	1602 Fremont Ave., N.
	C. F. Erdman	612 Ninth Ave., S. E.
	F. W. Springer	826 Delaware St., S. E.
	F. H. Orton	921 Lowry Bldg., St. Paul.
	J. B. Johnston	715 Fulton St., S. E.
	E. D. Brown	3525 Third Ave., S.
	James M. Walls	828 Lowry Bldg., St. Paul.
	H. S. Godfrey	1766 Girard Ave., S.
	Jay N. Pike	820 Donaldson Bldg.
	H. E. Robertson	507 Essex St., S. E.
	A. S. Wells	801 Andrus Bldg.
	William F. Lasby	425 Walnut St., S. E.
	F. H. Scott	1307 Sixth St., S. E.
	E. T. Bell	215 Walnut St.
	P. J. Brekhus	3719 Pleasant Ave.
	Norman J. Cox	986 Fifteenth Ave., S. E.
	George M. Damon	3340 Portland Ave.
	I. H. Derby	2157 Commonwealth Ave., St. Paul.
	R. O. Green	828 Lowry Bldg.
	C. A. Griffith	615 Twelfth Ave., S. E.

W. P. Larson.....614 Ninth Ave., S. E.
H. C. Lawton.....937 Lowry Bldg., St. Paul.
H. A. Maves.....505 Donaldson Bldg.
A. A. Pagenkopf.....808 Pittsburgh Bldg., St. Paul.
R. E. Scammon.....117 Walnut St., S. E.
C. A. Weithoff.....806 Forty-second Ave.
M. R. Wilcox.....802 Donaldson Bldg.
W. F. Allen.....3352 Donaldson Bldg.
Moses Barron .....763 Holly Bldg.
E. A. Baumgartner.....1700 Fourth St., S. E.
H. H. Brown.....914 Fourth St., S. E.
Oscar Cooperman .....638 Sixth Ave., N.
R. W. Countryman.....401 Reid Corner.
C. F. Dwight.....4818 Thirty-ninth St.
F. W. Dunbar.....3044 Holmes Ave.
C. O. Flagstad.....229 Cedar Ave.
Mary V. Hartzell.....1224 Mary Place.
W. H. Hunter.....112 Church St., S. E.
R. R. Knight.....304 Pillsbury Bldg.
H. J. Leonard.....2634 Portland Ave.
William McDougall .....521 Syndicate Bldg.
R. S. Maybury.....1931 Fourth Ave., S.
M. L. Norman.....114 Arthur Ave., S. E.
M. O. Pattridge.....802 East Lake St.
C. H. Petri.....1301 East Franklin St.
C. J. V. Pettibone.....112 Church St., S. E.
G. W. Reynolds.....3811 Tenth Ave., S.
W. A. Roll.....521 Syndicate Bldg.
C. E. Rudolph.....2337 Central Ave., N. E.
F. W. Schultz.....802 Donaldson Bldg.
Joseph F. Shellman.....903 Lowry Bldg., St. Paul.
A. J. Weiss.....3708 Stevens Ave.
A. A. Zieroid.....307 Donaldson Bldg.
E. K. Green.....307 Reid Corner.
R. T. LaVake.....203 Donaldson Bldg.
W. E. Camp.....329 Union St., S. E.
L. P. Bell.....329 Union St., S. E.
E. R. Hoskins.....1700 Fourth St., S. E.
C. F. Otto.....1313 Sixth St., S. E.
R. O. Weiss.....1602 Fremont Ave., N.

NASHVILLE, TENN.

Vanderbilt University, Department of Dentistry.

Drs. H. W. Morgan.....211 Sixth Ave., North.
J. A. Dale.....401 Jackson Bldg.
L. G. Noel. .....529½ Church St.
R. B. Bogle.....505-503 Hitchcock Bldg.
W. A. Bryan.....146 Eighth Ave., North.
Y. W. Haley.....605-611 Hitchcock Bldg.
Harrington Marr .....619½ Church St.
S. H. Sheib.....South Campus.

B. F. Hambleton.....South Campus.
Larkin Smith.....131 Eighth Ave., North.
J. H. Phillips.....South Campus.
A. C. Braley.....505-507 Hitchcock Bldg.
J. W. Winn.....217½ Fifth Ave., North.
R. R. Byrnes.....10 Evelyn St.
W. E. Reeves.....College.
S. R. Teachout.....College.
J. A. Sanders.....College.
J. M. Rogoff.....College.
A. A. Eggstein.....College.

LOUISVILLE, KY.

Louisville College of Dentistry.

Drs. W. E. Grant.....500 The Masonic Bldg.
H. B. Tileston.....316 Equitable Bldg.
M. H. Grant.....College.
E. M. Kettig.....332-336 Atherton Bldg.
N. T. Yager.....Atherton Bldg.
W. M. Randall.....College.
R. E. Grant.....500 The Masonic Bldg.
Max M. Eble.....Equitable Bldg.
H. B. Holmes.....134 Waverly Ave.
R. M. Parks.....College.
E. Lee Heflin.....College.
Heman Humphrey.....College.
B. D. Rivers.....968 Baxter St.
C. D. Render.....College.
J. B. Jordon.....334 Atherton Bldg.
W. F. Farrar.....Masonic Bldg.
Boone Redens.....College.
F. W. Rounds.....College.
A. P. Williams.....College.
C. H. Hamilton.....College.
A. C. Blank.....College.
G. C. Young.....College.

TORONTO, CANADA.

Royal College of Dental Surgeons.

Drs. J. B. Willmott.....96 College St.
W. T. Stuart.....Howard Park Ave. and Indian Road.
W. E. Willmott.....96 College St.
A. Primrose.....100 College St.
A. E. Webster.....3 College St.
A. A. Stewart.....2 Bloor St., East.
F. A. Clarkson.....471 College St.
G. G. Hume.....1 Bloor St., East.
G. M. Hermiston.....18 Bloor St., East.
J. C. McLennon.....36 Dunbar Road.
W. E. Cummer.....2 Bloor St., East.
J. S. Graham.....55 College St.

W. H. Doherty.....26 College St.
F. D. Price.....351 Sherbourne St.
B. O. Fife.....Dundas St.
H. M. Lancaster.....5 Queen's Park.
Thomas Cowling .....1 Grant St.
G. A. Wilcox.....267 College St.
E. W. Paul.....205 Yonge St.
A. J. McDonagh.....2 Bloor St., East.
Wallace Seccombe .....144 Carlton St.
J. G. Coram.....470 Parliament St.
W. C. Smith.....1512 Yonge St.
T. W. Dawson.....2 Bloor St., East.
C. A. Corrigan.....2 College St.
E. E. Bruce.....26 College St.
R. D. Thornton.....319 Roncesvalles Ave.

CLEVELAND, OHIO.

Western Reserve University Dental School.

Drs. E. E. Belford.....922 Rose Bldg.
H. E. Friesell.....Highland Bldg., Pittsburgh, Pa.
R. W. Elliott.....10509 Euclid Ave.
S. W. Allen.....1598 Addison Road.
C. O. Witter.....5415 Bridge Ave.
W. C. Stillson.....1554 East One Hundred and Fifth St
L. A. Krejci.....858 Rose Bldg.
R. G. Pearce.....Medical School.
V. C. Rowland.....10509 Euclid Ave.
J. H. Hood.....1102 New England Bldg.
C. L. McDonald.....253 Lennox Bldg.
E. L. Pettibone.....5313 Franklin Ave.
Isidore Grohs .....Society for Savings Bldg.
Henry Steuer .....956 Rose Bldg.
G. T. Baldwin.....5415 Bridge Ave.
H. H. Dowd.....918 Rose Bldg.
L. H. Stuart.....Medical School.

CHICAGO, ILL.

Chicago College of Dental Surgery.

Drs. T. W. Brophy.....81 East Madison St.
C. N. Johnson.....22 East Washington St.
W. L. Copeland.....31 North State St.
C. S. Case.....108 North State St.
J. N. Roe.....706 South Lincoln St.
W. H. G. Logan.....29 East Madison St.
J. P. Buckley.....29 South State St.
Charles H. DeWitt.....Valparaiso, Ind.
F. E. Roach.....Mallers Bldg.
W. D. Zoethout.....Valparaiso, Ind.
W. E. Putz.....1852 Blue Island Ave.
E. W. Elliott.....39 South State St.
J. E. Schaefer.....1747 West Harrison St.

P. G. Puterbaugh.....2460 North Clark St.
R. E. MacBoyle.....2460 North Clark St.
L. C. Borland.....209 South State St.
J. R. Watt.....1747 West Harrison St.
A. B. Allen.....1747 West Harrison St.
R. I. Wood.....1747 West Harrison St.
C. A. Hallie.....1747 West Harrison St.
G. M. Abbott.....1747 West Harrison St.
J. S. Grimson.....1747 West Harrison St.
J. E. Kolar.....1747 West Harrison St.
J. L. Meredith.....1747 West Harrison St.
R. E. Moyer.....1955 West Monroe St.
A. E. DeReimer.....81 East Madison St.
M. L. Schmitz.....5606 Winthrop Ave.
P. D. Summers.....1905 Jackson Blvd.
J. A. Kendall.....1747 West Harrison St.
I. Jirka.....1747 West Harrison St.
T. A. Grisamore.....29 East Madison St.
M. L. Moldt.....1407 Masonic Temple.

ANN ARBOR, MICH.

University of Michigan, College of Dental Surgery.

Drs. N. S. Hoff.....College.
L. P. Hall.....College.
E. T. Loeffler.....705 South State St.
M. L. Ward.....College.
R. W. Bunting.....916 Church St.
G. L. Streeter.....College.
E. D. Campbell.....College.
W. P. Lombard.....College.
F. G. Novey.....College.
G. C. Huber.....College.
R. B. Howell.....College.
A. J. Schroeder.....College.
H. S. Bailey.....College.
C. G. Darling.....College.
C. J. Lyons.....College.
M. T. Watson.....College.
E. T. Whitman.....340 South State St.

CINCINNATI, OHIO.

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SAN FRANCISCO, CAL.

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M. T. Rhodes.....First National Bank Bldg.
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Kansas City Dental College.

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University of Buffalo, Dental Department.

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Marshall Clinton .....556 Franklin St.
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C. F. Bevan.....College.
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S. J. Fort.....College.
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T. S. Waters.....756 North Eutaw St.
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H. E. Kelsey.....817 Park Ave.
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W. W. Parker.....College.
L. D. Coriell.....516 Park Ave.
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Corydon Palmer .....College.
E. P. Brown.....College.
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J. G. Fife.....College.
William Mitchell.....College.
C. A. Timme.....College.
E. S. Dashiell.....College.
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G. J. Smith.....330 North Charles St.
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Phladelphia Dental College.

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F. St. Elmo Rusca.....2332 North Twenty-ninth St.
C. E. B. Addie.....1300 North Twenty-ninth St.
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Cincinnati College of Dental Surgery.

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C. T. Souther.....College.
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F. F. Fletcher.....610 Chemical Bldg.
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Martin Schmidt .....1402 South Grand Ave.
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E. C. Buck.....892 Dennison Ave.
H. R. Wright.....Central National Bank Bldg.
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R. B. Wiltberger.....106 East Broad St.
H. S. Shumway.....7 East Town St.
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ST. LOUIS, MO.

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PITTSBURGH, PA.

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CHICAGO, ILL.

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Henry C. Lee.....3856 West Harrison St.

F. J. Bernard.....1950 Milwaukee Ave.
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NEW ORLEANS, LA.

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C. W. Duval.....Tulane Campus.
Irving Hardesty.....Tulane Campus.
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H. B. Gessner.....1105 Maison Blamche Bldg.
S. H. McAfee.....1237 Maison Blamche Bldg.
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LOS ANGELES, CAL.

University of Southern California.

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W. C. Smith.....545 Chamber of Commerce, Pasadena.
C. D. Lockwood.....Pasadena.
E. L. Leonard.....Marsh-Strong Bldg.
B. F. Eshelman.....Story Bldg.
J. W. Reeves.....Marsh-Strong Bldg.
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Garrett Newkirk .....Pasadena.
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Ingle Carpenter .....California Bldg.
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J. R. McCoy.....Brockman Bldg.
I. D. Nokes.....Marsh-Strong Bldg.
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Mark Kelsey .....Auditorium Bldg.

M. M. Dixon.....Story Bldg.
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H. P. Bailey.....Auditorium Bldg.
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G. M. Crow.....Wright & Callender Bldg.
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WASHINGTON, D. C.

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C. H. Howland.....College.
H. P. Davis.....1922 Third St., N. W.
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E. D. Williston.....1507 S St., N. W.
H. C. Scurlock.....428 College St., N. W.
C. I. West.....924 M St., N. W.
J. W. Mitchell.....817 T St., N. W.
E. E. Just.....College.
E. B. Keemer.....633 Fairmont St., N. W.
Albert Ridgeley.....1543 M St., N. W.

DENVER, COLO.

Colorado College of Dental Surgery.

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G. C. Ainsworth.....220 Clarendon St.
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W. E. Farris.....711 Boylston St.
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James Keltie.....419 Boylston St.
Olga Leary.....17 Grosvenor Road, Jamaica Plain.
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C. B. Wry.....60 Mountain Ave., Revere.
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L. Von Schmittuo.....879 Madison Ave.
R. Snowden .....879 Madison Ave.
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R. McKinney .....912 Memphis Trust Bldg.
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S. W. Moore.....1701 Guilford Ave.

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William Sevier .....707 Ewing Ave.
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A. W. H. Lindsay.....319 Pleasant St.
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F. V. Woodbury.....318 Pleasant St.
W. W. Woodbury.....17 Spring Garden Road.
A. F. Buckley.....209 South Park St.
D. F. Harris.....80 South Park St.
R. H. Woodbury.....17 Spring Garden Road.
M. A. Lindsay.....319 Pleasant St.
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Charles A. Brackett.....102 Touro St., Newport, R. I.
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George H. Monks.....67 Marlborough St.
William P. Cooke.....330 Dartmouth St.
William H. Potter.....16 Arlington St.
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George H. Wright.....149 Newbury St.
Julius B. Hovestadt.....19 Exeter St.

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L. G. Taylor.....College.
A. M. Wilson.....College.
R. D. Irland.....College.
M. W. Rice.....513 Commerce Bldg.
William Finn.....College.
H. B. McMillen.....Cor. Eleventh and Locust Sts.
J. B. Connel.....College.
E. H. Westenhaver.....College.
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F. B. Rogers.....College.
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WASHINGTON, D. C.

George Washington University, Department of Dentistry.

Drs. J. R. Walton.....724 Ninth St.
D. K. Shute.....College.

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2 Univ. of Minnesota, Dental Department	C. M. Jackson, M. S., M. D.	1 G. P. Frankforter, W. A. Pi 2 A. Dwyer, M. D. W. S. Ha	E. P. Le Ph. D.	D	H. E. Robertson, D. A., M. D.	Larkin Smith, M. D.	T. G. Lee, B. S., M. D.	2. G. M. Damon, D. D. S.	Z. M. Walls, D. M. D.	T. B. Hartzell, M. D., D. M. D.	
3 Vanderbilt Univ. Department of Dentistry	Harrington Marr, M. D.	Samuel H. Shelh, M. D.	R. F. H M. D.	Hilton,	Larkin Smith, M. D.	Larkin Smith, M. D.	Larkin Smith, M. D.	3. J. H. Phillips, D. D. S.	J. H. Phillips, D. D. S.	L. G. Noel, M. D. D. S.	
4 Louisville College of Dentistry	W. E. Grant, M. D.	R. M. Parke Ph. D.	D. D. H M. D.	S.	C. D. Snyder, M. D.	C. D. Snyder, M. D.	C. D. Snyder, M. D.	4. W. M. Randall, D. D. S.	W. M. Randall, D. D. S.	H. B. Tileston, M. D., D. S.	H. B. Tileston, M. D., D. S.
5 Royal College of Dental Surgeons	W. T. Stuart, C. M. D.	1 W. Shaw, M. D. I. H. N. Macwatters, B. A., Sc. T. H. Gosling, L. D. S., D. D. S.	F. A. C M. D.	on,	A. E. Webster, M. D., D. D. S., L. D. S.	J. S. Graham, M. B., M. R. C. S.	J. S. Graham, M. B., M. R. C. S.	5. W. H. Doherty, L. D. S., D. D. S.	W. H. Doherty, L. D. S., D. D. S.	A. E. Webster, M. D., D. D. S.	A. E. Webster, M. D., D. D. S.
6 Western Reserve Univ. School of Dentistry	R. W. Elliott, Ph. D., M. D.	H. S. Reed, Ph. D.	R. G. P M. D.		V. C. Hoxsland, A. B., M. D.	C. L. McDonald M. D.	W. C. Sullivan D. D. S.	6. W. C. Sullivan, D. D. S.	Hunry Steuer, D. D. S.	H. E. Friesell, D. D. S.	H. E. Friesell, D. D. S.
7 Chicago College of Dental Surgery	W. L. Copeland, M. D.	1 a t F. J. Roc, A.M., Sc.D.	W. D. M. D.	Lloyd,	W. H. G. Logan, M. D., D. D. S.	C. M. DeWitt, A. M., M. D.	C. M. DeWitt, A. M., M. D.	7. R. I. Wood, D. D. S.	J. E. Kolar, L. D. S., D. D. S.	C. N. Johnson, L. D. S., D. D. S.	W. H. G. Logan, M. D., D. D. S.
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9 Ohio College of Dental Surgery	H. W. MacMillan, M. D.	1 J. N. Oesterly, N. C. Pe 2 J. H. Mayes, D. D. S.	W. J. Mc M. D.		A. E. Osmond, M. D.	A. E. Osmond, M. D.	A. E. Osmond, M. D.	9. C. W. Noel, D. D. S.	W. H. O. McGehee, M. D., D. D. S.	W. H. O. McGehee, M. D., D. D. S.	H. T. Smith, M. D.
10 Univ. of California, College of Dentistry	H. B. Carey, B. S., M. D.	1 and 2 O. S. Mulberry, D.D.S.	F. G. Maxwell M. S., Ph. D.		Jean W. Cooke, A. B., M. D.	Jean W. Cooke, A. B., M. D.	H. B. Carey, B. S., M. D.	10. E. H. Mauk, D. D. S.	E. H. Mauk, D. D. S.	J. D. Hodgen, D. D. S.	J. M. Taft D. D. S.
11 Univ. of Iowa, College of Dentistry	H. J. Prentiss, M. D.	1 E. W. Rockwood 2 A. W. Hixson, B. A.	J. T. McClintock M. A., M. D.		Henry Albert, M. S., M. D.	Henry Albert, M. S., M. D.	H. J. Prentiss M. D.	11. F. H. Volland, M. D., D. S.	F. H. Volland, M. D., D. S.	F. Breene, M. D., D. D. S.	H. H. Volland, M. D., D. S.
12 Indiana Dental College	J. T. Wheeler M. D.	1 and 2 J. N. Norris M.D. Ph.G.	F. A. Morr M. D.		G. F. Hunt M. D., D. D. S.	H. K. Langdon M. D.	C. D. Lucas D. D. S.	12. C. D. Lucas, D. D. S.		G. E. Hunt, M. D. D. S.	G. F. Hunt M. D. D. S.
13 Kansas City Dental College	J. H. Lansing	1 and 2 F. W. Peters Ph. D.	O. P. Fabre M. D.		J. D. Patterson M. D.		E. L. Stewart M. D.	13. M. Dewey, M. D., D. D. S.		R. L. Christi, D. D. S.	C. C. Allp, D. D. S.
14 Univ. of Buffalo, Dental Department	G. A. Himmelsbach	1 and 2 J. McCall M. A., D. D. S.	G. J. Hafer M. D.		A. E. Wechsler M. D.	A. C. Abbott, Sc. D. M. D.	G. F. Roberts, M. D.	14. J. L. Garretson, D. D. S.	J. L. Garretson, D. D. S.	D. H. Sl D. D. S.	D. H. Sliffe, D. D. S.
15 Baltimore College, Dental Department	J. W. Chambers M. D. S. Dana Greene, M. D.	1 Wm. Simon 2 W. H. Flexer, D.D.S.	G. E. Hac M. D., D. D. S.		M. W. Foster M. D., D. D. S.	M. W. Foster, M. D., D. D. S.	C. J. Grieves, D. D. S.	15.	W. G. Foster, D. D. S.	E. Boyle Smith, M. D., D. S.	M. W. Foster, M. D., D. D. S.
16 Philadelphia Dental College	J. B. Rothy, M. D.	1 and 2 H. H. Dunn M. D.	H. F. Stiffe M. D.		M. G. Wahl M. D.	F. E. Freeman M. D.	H. H. Cushing M. D.	16.	F. S. Rusca D. D. S.	S. H. Gulifird A. M., D. D. S., Ph. D.	O. J. Ingals D. D. S.
17 Cincinnati College Dental Surgery	Chas. Moorte M. D.	1 and 2 W. H. Gansky, D.D.S.	W. H. Stavle M. D.		Chas. Stoneman M. D. Ph. B.	Chas. Stoneman M. D., Ph. B.	Chas. Stoneman M. D., Ph. B.	17. T. F. Edwards, D. D. S.	T. F. Edwards, D. D. S.	G. M. Junkerman, M. D., D. D. S.	A. G. Schramm, D. D. S.
19 St. Louis Dental College	D. M. Schoemaker, B. S., M. D.	H. G. Brister, A. B., A. M.	L. F. Haskell, B. S.		J. W. Marshilton, B. S., M. D.	Edmond Bonnet, A. M., M. S., M. D.	Martin Schmidt, M. D.	19. S. T. McMillin, D. D. S.		F. F. Fletcher, D. D. S.	J. F. Harper, D. D. S.
20 Ohio State University, College of Dentistry	Josiah Medberry, M. D.	1 F. M. Stinton, B. S. Asbury Shark, D.D.S.	Clarence McPark, M. D.		H. B. Wright, M. D., M. D. S.	C. L. Spohr, M. D.	J. H. Warren, D. A.	20. H. M. Somans, D. D. S.	C. H. Hobbs, D. D. S.	H. M. Somans, D. D. S.	W. C. Grabam D. D. S.
21 Washington Univ. Dental Department	Marsh Pillman M. D.	1 and 2 E. F. Brady D. D. S.	O. H. Campbell, M. D.		J. E. Cook M. D.	J. E. Cook, M. D.	J. A. Bowen, D. D. S.	21. L. G. Neuhoff D. D. S.	L. G. Neuhoff D. D. S.	W. Fiesin, D. M. D. H. Kennedy M. D.	C. C. Jones M. D. D. S.
22 Univ. of Pittsburg College of Dentistry	L. McCurdy A. M., M. D.	1 and 2 A. F. Todd, Ph. D.	Robert Augustin M. D.		C. B. Jones M. D.	F. C. Frissell M. D. S.	F. C. Frissell M. D. S.	22. J. S. Ashbrook D. D. S.	L. W. Old, D. D. S.	H. E. Friesell, D. D. S.	O. L. Hertig A. M., M. D. S.
23 New York College of Dentistry	F. D. Weisse, M. D.	1 and 2 F. S. Gallagher, M. D. Ph. D.	J. Wolfe M. D.		Henry T. Lee M. D.	Henry T. Lee M. D.	J. H. Stein, M. D.	23. J. L. Peters, D. D. S.	J. L. Peters, D. D. S.	A. R. Hiser, D. D. S.	
COLLEGE	**ANATOMY**	**1. CHEMISTRY 2. METALLURGY**	**PHYSIOLOGY**		**GENERAL PATHOLOGY**	**BACTERIOLOGY**	**HISTOLOGY**	**DENTAL ANATOMY**	**OPERATIVE TECHNICS**	**OPERATIVE DENTISTRY**	**DENTAL PATHOLOGY**
24 Univ. of Illinois College of Dentistry	A. C. Eschelmyer, B. S., M. D., Ph. D.	1 W. H. Walker, A. C. 2 W. C. Hawthorne, A. M., M. D.	G. P. Dreier, A. B., Ph. D		Louis Schultz, M. D., D. D. S.	Arthur M. Hixson, A. B., D. S.	F. B. Noyes, B. S. D. D. S.	24. Louis E. Bake, D. D. S.	D. M. Gaillo, D. D. S.	D. M. Gallo, D. D. S.	F. B. Moorehead, A. B., D. D. S.
25 Tulane Univ., Dental Department	Irving Harlesty A. B.	1 and 2 A. A. Weiz M.Ph. M.D.	Gerstle Wiley, A. M., M. D.		C. W. Duval M. D.	C. W. Duval M. D.	Irving Harbrett, A. B.	25. C. S. Tyler, D. D. S.	E. B. Turner D. D. S.	F. H. Meafee, D. D. S.	C. H. McAfee D. D. S.
26 College of Dental and Oral Surgery, N. Y.	C. M. Ford, A. M., M. D.	1 and 2 D. W. Ward, Ph. D.	H. H. Juvenay, A. B., M. D.		W. S. Bussell, M. D.	W. S. Russell M. D.	C. M. Ford A. M., M. D.	26.		A. L. Swift, D. D. S.	A. L. Swift D. D. S.
27 Univ. of Southern California, Dental Dept.	W. P. Maloney, A. M., M. D.	1 and 2 A. H. Jones A. M., M. D.	A. M. Curtis, M. D.		E. L. Leonard B. S., M. D.	E. L. Leonard B. S., M. D.	E. L. Leonard B. S., M. D.	27. A. C. LaTourette, D. D. S.	A. C. LaTourette, D. D. S.	W. C. Smith, D. D. S.	W. C. Smith, D. D. S.
28 Howard Univ. Dental Department	D. S. Lamb, A. M., M. D.	1 H. C. Seurgin, A. B., M. D. 2 H. P. Davis, D. D. S.	C. B. Jones M. D.		Paul Harlach, M. S., Ph. D.	Paul Harlach, M. S., Ph. D.	Paul Harlach, M. S., Ph. D.	28. F. P. Sayrier, D. D. S.	A. J. Brown, D. D. S.	A. J. Brown, D. D. S.	Collins Marshall, M. D.
29 Columbia College Dental Surgery	A. G. Staunton, A. M.	1 and 2 A. L. Patter B. S.	J. Wilkes M. D.		F. P. Morning, M. D.	F. P. Morning, M. D.	F. P. Morning, M. D. & H. A. Fynn D. D. S.	29. F. W. Frahn, D. D. S.	F. W. Frahn, D. D. S.	W. T. Chamera, D. D. S.	M. Cattles, M. D. D. S.
30 Tufts College Dental School	H. H. Gorman, M. D.	1 and 2 A. M. Ph. D.	G. V. C. Goodson A. M., M. D.		Timothy Leary M. D.	Timothy Leary M. D.	Timothy Leary M. D.	30. B. H. Street, D. D. S.	B. H. Street, D. D. S.	E. A. Johnson, D. D. S.	T. Leary A. M. M. D.
31 Georgetown Univ. Dental Department	Frank Baker A.M., Ph.D. M.D.	1 J. D. Hod 2 L. J. Schark, D. D. S.	F. A. Tenford,		R. A. Hamilton M. D.	R. A. Hamilton M. D.	E. L. Morgan, B. S., M. D.	31.	W. M. Cogan, D. D. S.	H. H. Allen, D. D. S.	D. L. Taylor D. D. S.
32 Medico-Chi of Philadelphia, Dental Dept.	J. C. Meister, M. D.	1 Geo. H. Meeker, 2 Michaelbrand Ph. D., D. D. S.	Isaac Ger A. M. M. D.		Jno. McFarland M. D.	Jno. McFarland, M. D.	J. N. Broomell, D. D. S.	32. J. N. Broomell, D. D. S.	W. D. Sayler, D. D. S.	L. A. Faught, D. D. S.	L. A. Faught, D. D. S.
33 Lincoln Dental College, Univ. of Nebraska	R. H. Wolcott, M. D.	1 Benton Dales Ph.D. 2 Wm. Hutchinson H. W. A. Wiese	R. A. Jamie M. D.	son,	R. H. Wolcott, M. D.	R. H. Wolcott, A.M.M.D.	R. H. Wolcott, A.M.M.D. & G. A. Gowdy, D.D.S.	33. F. W. Webster, D. D. S.	W. C. Davis, B. S., M. D., D. D. S.	W. C. Davis, B. S., D. D. S., M. D.	
34 Barnes Dental College	D. McC. Judd Ph. D., A. M. M. P.	1 C. M. Healy, B. S., Ph. D. 2 D. C. Arnold DMD	F. E. Bo M. D.		R. H. Fulton, A. B. Sc. D. M. D.	R. H. Fulton A. B. Sc. D. M. D.	T. W. Taylor M. D. D. S.	34. T. G. Bussell D. M. D.	T. G. McGowan D. D. S.	C. O. Simpson, D. D. S.	D. H. Goss, D. D. S.
35 Laval Univ. Dental Department	J. A. Lahaye M. D.	1 H. Carrier, Ph. D. 2 J. A. Gendreau, M. D.	J. O. A. Bureau M. D.		E. Dubeau M. D., D. D. S.	Gus Labelle, M. D.	Jean P. Decarie, M. D.	35. J. G. A. Gendreau, D. D. S.	J. G. A. Gendreau, D. D. S.	Joseph Nolin, D. D. S.	E. Dubeau, M. D., D. D. S.
36 Creighton Univ., College of Dentistry	P. T. Conlon, M. D.	1 E. Dyer A. B., M. A. 2 C. F. Cowley, J. A. Hancock M. D.	A. E. Mulfeld M. D.		J. S. Foote, A. M. M. D.	A. Speer, M. D.	E. H. Bruening, D. D. S.	36. E. H. Bruening D. D. S.	F. W. Reed, D. D. S.	A. H. Hipel, M. D., D. D. S.	A. H. Hipel, M. D., D. D. S.
37 Medical College of Virginia, Dental Dept.	W. G. Christian M. D.	W. A. Shepherd, A. M.	A. L. Gra M. D.		A. H. Straus, M. D.	A. H. Straus, M. D.	W. A. Shepherd, M. D.	37. T. W. Scales, D. D. S.		H. G. Bussell, D. D. S.	T. M. Scales, D. D. S.
38 Univ. of Tennessee, College of Dentistry	A. H. Wittenberg A. B. M. D.	1. L. J. Desiris, Ph. D. 2. L. J. McKee, D. D. S.	O. S. Ware M. D.		H. T. Brooks, A. B., M. D.	H. T. Brooks A. B., M. D.	H. A. Holder D. D. S. A. H. Wittenberg, A. B., M. D.	38. D. M. Cattell D. D. S.	D. M. Cattell, D. D. S.	D. M. Cattell, D. D. S.	H. A. Holder D. D. S.
39 Texas Dental College	H. T. Morris M. D.	1 A. Kruse M. D. 2 A. Loy, C. E.	E. M. Anders A. B., A. M. M. D.	on,	E. F. Cook M. D.	E. F. Cook, M. D.	G. F. Gambill D. D. S. E. F. Cook M. D.	39. J. F. Gambill D. D. S.		T. P. Williams D. D. S.	G. F. Gambill D. D. S.
40 McGill Univ. Dental Department	A. C. Geddes, Ch. B. M. D. F.R.S.E.	1 E. F. Burton A. C. McGill 2 G. S. Cameron, L.D.S.			J. G. Adami M. A. M. D.	J. G. Adami M. A. M. D.	C. F. Empey, B. Sc.	40.	A. W. Thornton, D. D. S., L. D. S.	D. J. Dorwick, D. D. S., L. D. S.	C. H. Tyler D. D. S.
41 Univ. of Maryland, Dental Department	J. H. Smith, A. M., M. D.	1 F. J. Bode 2 J. S. Vetter, D. D. S.	J. C. Hemmeter, Ph. D., M. D.		R. L. Mitchell M. D.	R. L. Mitchell, M. D.	C. V. Matthews D. D. S.	41. F. F. Hayes, D. D. S.	I. S. Geiser, D. D. S.	J. H. Davis, D. D. S.	R. L. Mitchell, M. D.
42 Meharry Dental College	P. H. Boone, A. M. M. D.	T. H. Elder, A. M. M. D.	J. A. Lesley, A. M. M. D.		J. H. Holman, M. D.	J. H. Holman, M. D.	J. H. Holman, M. D.	42. T. H. Yeorice D. D. S.	J. A. Phillips D. D. S.	J. B. Singleton, D. D. S.	M. W. Moore M. D. D. S.
43 Dalhousie Univ., Faculty of Dentistry	A. W. H. Lindsay, B. A., M. D.	1 and 2 F. Murray, B.A., Ph.D.	D. F. Harris, M. D., D. Sc. F.R.S.E.		M. A. Lindsay B. Sc. M. D. Ch. B.	M. A. Lindsay B. Sc. M. D. Ch. B.	D. F. Harris, M. D., D. Sc. F.R.S.E.	43. F. W. Rhys D. D. S.	F. W. Rhys D. D. S.	F. W. Rhys D. D. S.	A. W. Cogswell D. D. S.
44 Harvard Univ. Dental School	John Warren, M. D.	1 H. C. Smith Ph. G.	W. H. Carson M. D.		F. B. Mallory M. D.	H. C. Ernst M. D.	J. L. Bremmer M. D.	44.		W. H. Potter, D. M. D.	C. A. Brackett, D. M. D.
45 Western Dental College	D. O. Smith, A. B., M. D.	W. M. Cress, A. B., M. D.	L. G. Taylor, A. M., M. D.		A. M. Wilson, A. M. M. D.	R. D. Friend, M. D.	D. F. Island, M. D.	45. M. S. Rice D. D. S.	W. Fire D. D. S.	H. McMillan, D. D. S.	H. J. Prescott M. D. D. S.
46 George Washington Univ. School of Dentistry	Matthew Kelling, M. D.	1 C. C. Mont 2 H. D. Farey	S. J. Fears Ph. D.		F. P. Russell, M. D.	F. P. Russell, M. D.	F. P. Russell, M. D.	46.	C. L. Ober D. D. S.	H. C. Thompson, D. D. S.	
47 North Pacific College of Dentistry,	J. A. Pettit, M. D.	1 C. F. Hunsinger, 2 H. P. Drake, L.L.D., D.M.D.	H. C. Veiney, M. D.		R. C. Veney, M. D.	F. P. Jennet M. D.	R. C. Veney, M. D.	47. F. Starr, B. S., D. D. M. D.	L. I. Fla Patrick, D. D. S.	H. C. Miller, M. D., D. D. S.	
COLLEGE	**ANATOMY**	**1. CHEMISTRY 2. METALLURGY**	**PHYSIOLOGY**		**GENERAL PATHOLOGY**	**BACTERIOLOGY**	**HISTOLOGY**	**DENTAL ANATOMY**	**OPERATIVE TECHNICS**	**OPERATIVE DENTISTRY**	**DENTAL PATHOLOGY**

*The above list of Dental Colleges is given in the order in which the Colleges joined the Institute

The secretary has endeavered to compile the above chart from lists furnished by the deans of our membership co professor or teacher in charge of each department is given. Where several men are teaching the same subject, correct as possible.

nstitute of Dental Teachers

MATERIA MEDICA et THERAPEUTICS	PROS. DENTISTRY 4. Crown and Bridge Work 5. CERAMICS	ORAL SURGERY	ANESTHESIA	RADIOGRAPHY	ORTHODONTIA	COMPARATIVE DENTAL ANATOMY	ORAL HYGIENE	PHYSICAL DIAGNOSIS	DENTAL JURISPRUDENCE	1. ETHICS 2. ECONOMICS
1. Geo. C. Poundstone, D.D.S.	1 and 2 F. H. Prothero, D.D.S.	T. L. Gilmer, Sr. D., M.D., D.D.S.	H. A. Fette, M.D., D.D.S.	F. D. Leach, D.D.S.	J. B. Gillery, D.D.S.	1. G. A. Dorsey, Ph.D.	A. D. Black, M.A., M.D., D.D.S.	W. B. Wiggin, M.D.	Edmund Noyes, D.D.S.	1. Edmund Noyes, D.D.S. 2. C. N. Peirce, D.D.S.
2. A. D. Hirschfelder, E.E., M.D., LL.D.	1. W. A. Wease, D.M.D. 2. H. B. Orton, L.D.S.	T. B. Hastied, A.M., M.D.	R. R. Knight, A.M., M.D.	R. R. Knight, A.M., M.D.	O. A. Weiss, D.M.D.	2. M. V. Hartzell, D.M.D.		T. B. Hartzell, M.D., D.M.D.		A. Owre, M.A., M.D., D.M.D.
3. J. V. W. Haley, M.D.	1, 2 and 3 J. A. Fate, D.D.S.	W. A. Bryan, A.M., M.D.	T. W. Haley, M.D.	H. D. Bogle, M.D., D.D.S.	R. B. Bogle, M.D., D.D.S.	3.	R. B. Bogle, M.D., D.D.S.		J. W. Winn, D.D.S.	J. W. Winn, D.D.S.
4. H. B. Holmes, D.D., D.Sc.	1. W. M. Handsel, D.D.S. 2. R. E. Grant, D.D.S. 3. W. M. Handsel, D.D.S.	H. H. Grant, A.M., M.D.	N. T. Tager, D.D.S.	W. E. Grant, M.D., D.D.S.		4.	B. D. Bilyeu, A.M., D.D.S.			Max M. Stile, D.D.S.
5. W. E. Willmott, A.M., M.D., D.D.S.	1. W. S. Cumnor, L.D.S., D.D.S. 2. A. Shewan, L.D.S., D.D.S. 3. J. A. Richardson, L.D.S., D.D.S.	A. Primrose, C.M., M.B., C.S.	E. W. Teal, L.D.S., D.D.S.	F. D. Price, L.D.S., D.D.S.	G. O. Hunt, L.D.S., D.D.S.	5.	W. H. Doherty, L.D.S., D.D.S.	A. Primrose, M.B., M.B., C.S.		J. B. Willmott, L.D.S., D.D.S.
6. V. C. Rowland, A.M., M.D.	1 and 2 D. E. Ireland, D.D.S. 3. W. Alvo, D.D.S.	R. W. Elliott, Ph.B., M.D.	F. W. Allen, D.D.S.	W. C. Hill, M.D.	L. A. Krejci, D.D.S.	6.	W. C. Sillison, D.D.S.	J. M. Hood, D.D.S.		G. M. Hermiston, B.A., L.D.S., D.D.S.
7. J. P. Buckley, Ph.G., D.D.S.	1. P. Buck, D.D.S.	F. G. Patterson, M.D., D.D.S.	M. F. Meloy, M.D., D.D.S.	C. E. Case, M.D., D.D.S.		7.	D. L. Wood, D.D.S.	W. H. G. Logan, M.D., D.D.S.	W. E. Putt, M.D.	L. D. Bull, L.D.S., D.D.S.
8. E. T. Loeffler, A.M., M.D., D.D.S.	1. S. Hoff, D.D.S. 2. W. Ward, D.D.S. 3. S. Hoff, D.D.S.	C. O. Darling, M.D., C.M.	E. T. Loeffler, B.S., M.D., D.D.S.	M. T. Watson, D.D.S.		8.	R. B. Howell, D.D.S.	E. T. Loeffler, B.S., M.D., D.D.S.	C. O. Darling, M.D.	J. Jackson, L.D.S., D.D.S.
9. G. V. Ellis, A.M., Ph.D., D.D.S.	1. M. L. Bayliss, D.D.S. 2. C. Herbruger, D.D.S. 3. W. Mitchell, D.D.S.	H. W. MacMillan, A.M., M.D.	H. T. Smith, D.D.S.	V. B. Dalton, D.D.S.		9.	F. M. Hood, D.D.S.	V. B. Dalton, D.D.S.	V. B. Dalton, M.D., D.D.S.	H. S. Hoff, D.D.S.
10. H. E. Clapp, D.M.D.	1. W. T. Sharp, D.D.S., M.D. 2. C. Rose, D.D.S.	J. O. Sharp, M.D., D.D.S.	G. E. Hubbell, M.D.	A. M. Suggett, D.D.S.		10.	Malcolm Goddard, B.S., D.D.S.		Louis Burditt, Ph.B., LL.B.	J. S. Cassidy, A.M., M.D., D.D.S. H. V. Smith, D.D.S.
11. C. E. Cupp, A.M., M.D., D.D.S.	1 and 2 W. A. Hosford, B.A., D.D.S. 3. H. Verne Mann, D.D.S.	L. W. Bryan, M.D., M.Sc.		Richard Somma, D.D.S.		11.	F. T. Breese, M.D., D.D.S.	Chas. S. Grant M.D.	E. A. Rogers, M.D., D.D.S.	E. A. Rogers, M.D., D.D.S.
12. J. H. Sage, D.D.S.	1. Lester Cuppia, D.D.S.	C. A. Pfaffle, M.D., D.D.S.	D. E. Cifield, D.D.S.	H. E. Raper, M.D., D.D.S.	C. R. Jackson, D.D.S., M.D.	12.	G. E. Hunt, D.D.S.	F. R. Wynn, M.D.	F. A. Johnson, L.D.S.	G. F. Hunt, M.D., D.D.S.
13. N. Lafayette, D.D.S.	1. W. F. Sirrk, D.D.S. 2. C. Hollingsworth, D.D.S. 3. A. Custen, D.D.S.	J. D. Griffith, M.D.	H. W. Allen, M.D.	E. H. Skinner, M.D.	Martin Dewey, M.D., D.D.S.	13.	Martin Dewey, M.D., D.D.S.	T. G. Duckworth, A.B., M.D.	L. C. Boyle	1. J. S. Stuart, M.D. 2. J. E. Kirby, D.D.S.
14. F. J. H. Lane, M.D.	1. Hoffman, D.D.S. 2 and 3 C. E. Buell, D.D.S.	Marshall Clinton, A.M., M.D.	E. H. Long, M.D.	G. M. Piero, D.D.S.	A. Hoffman, D.D.S.	14.	A. Hoffman, D.D.S.	G. Z. Haller, M.D.	E. H. Long, M.D.	A. W. Plumley,	1 and 2 J. W. Beach, D.D.S.
15. C. Ellis, Sr., D.D.S.	1. P. B. Turner, M.D., D.D.S. 2. Wm. Capon, D.D.S.	M. H. Crise, M.D., D.D.S.	B. H. D. Swing, D.D.S.		J. D. Love, D.D.S.	15.				
16. J. F. Mund, M.D., D.D.S.	1 and 2 Wm. B. Rosser, D.D.S. 3. Hollis Dorsey, Jr., D.D.S.	C. F. Dixon, D.D.S.	B. D. Dorr, D.D.S.	L. D. Cattell, D.D.S.	H. E. Kelsey, D.D.S.	16.	C. J. Grieves, D.D.S.		B. Holly Smith, M.D., D.D.S.	W. W. Parker, M.D.
17. O. E. Inglis, D.D.S.	1 and 2 Dr. Guilford A. Phillips 3. Dr. Guilford A. Phillips	C. N. Rattell, D.D.S., M.D.	M. Rose Tasker M.D.		S. H. Guilford, D.D.S., Ph.D., A.M.	17.				J. H. Rhoads, L.L.B.
18. G. Erskine, D.D.S.	1. F. Edwards, D.D.S. 2. H. Edwards, D.D.S.	C. F. Souther, M.D.		Sidney Lange, M.D.	T. F. Edwards, D.D.S.	18.	A. Schramm, D.D.S.			
19. H. H. Horn, M.D., D.D.S.	E. E. Owen, D.D.S.	Virgil Loeb, A.B., M.D., D.D.S.	O. B. Wister, D.D.S.		Frank Hodgers, D.D.S.	19.				V. D. T., A.M., LL.B.
20. W. C. Graham, D.D.S.	1. H. V. Cattell, D.D.S. 2. Allen B. Gray, D.D.S. 3. N. D. Whittredge, D.D.S.	J. W. Mears, M.D., D.D.S.	K. C. Bradshaw, M.D., D.D.S.	H. J. Means, M.D.	Alden Bush, D.D.S.	20.	H. M. Semans, D.D.S.	W. C. Graham, D.D.S.	K. C. Bradshaw, M.D., D.D.S.	R. E. Westfall, D.S.	W. C. Graham, D.D.S.
21. L. P. Healy, D.D.S.	W. M. Bavlett, D.D.S.	V. P. Blair, M.D.	H. M. Fisher, D.D.S.		B. E. Lischer, D.M.D.	21.		E. H. Keys, D.D.S.		Franklin Miller, L.L.B.	
22. C. N. Jeffries, D.D.S.	1. H. S. Merritt, D.D.S. Bel. Hayward, D.D.S. 3. H. S. Merritt, D.D.S.	R. L. McCurdy, A.M., M.D.	H. S. Baskett, D.D.S.	J. F. Biddle, D.D.S.	J. F. Biddle D.D.S.	22.	J. S. Ashbrook, D.D.S.	W. L. Pickes, D.D.S.	S. L. McCurdy, A.M., M.D.	W. L. Pickes, D.D.S.	W. L. Pickes, D.D.S.
23. A. L. Gray, M.D., L.D.S.		F. Lane Wright	J. T. Swathmey, M.D.	F. L. Lattertie, Jr A.M., D.Sc.	Ellison Hillyer, D.D.S., M.D.	23.	S. W. Van Haan, D.D.S.	Thos. Darlington, M.D.	Seward Erdman, A.M., M.D.		

MATERIA MEDICA et THERAPEUTICS	PROS. DENTISTRY 4. Crown and Bridge Work 5. CERAMICS	ORAL SURGERY	ANESTHESIA	RADIOGRAPHY	ORTHODONTIA	COMPARATIVE DENTAL ANATOMY	ORAL HYGIENE	PHYSICAL DIAGNOSIS	DENTAL JURISPRUDENCE	1. ETHICS 2. ECONOMICS
24. E. D. Crabtree, D.D.S.	1 and 2 W. Waite Dillavou, L.D.S., D.D.S. 3. C. E. Bibb, D.D.S.	P. B. Moorehead, A.B., M.D., D.D.S.	P. B. Moorehead, A.B., M.D., D.D.S.	J. C. McQuire, D.D.S.	F. H. Noyes, D.D.S.	24.	S. E. Meek, Ph.D.	E. D. Coolidge, D.D.S.		E. D. Brothers, D.D.S., LL.B.	
25. J. J. Hisley, M.D.	1. H. F. McGruder, D.D.S.	H. B. Gessner, A.M., M.D.	H. B. Gessner, A.M., M.D.	C. C. Samuel, M.D.	Paul DeTarnos, D.D.S.	25.	C. S. Tuller, D.D.S.	J. P. Wahl D.D.S.	H. B. Gessner, A.M., M.D.	A. L. Mehl, M.Ped., M.D.	1 and 2 A. G. Friedrichs, M.D.
26. W. S. Hurwitt, M.D., D.D.S.	1. H. L. Hurwitt, D.D.S. 2. C. Wm. Hurwitt, D.D.S.	J. W. Cornman, M.D., D.D.S.	J. McDermott, A.M., M.D.	J. E. McDermott, A.M., M.D.	Y. M. Jackson, A.M., M.D.	26.	H. L. Wheeler, D.D.S.			N. T. Shields, D.D.S.	
27. G. H. Walker, D.D.S.	1 and 2 H. F. Eshelman, D.D.S. 3. C. H. Eshelman, D.D.S.	C. D. Lockwood, A.B., M.D.	C. D. Lockwood A.B., M.D.	J. D. McCoy, D.D.S.	J. D. McCoy, D.D.S.	27.	J. D. Nokes, D.D.S.	Garrett Newkirk, M.D.		Ingle Carpenter, Ph.C., B.S., LL.B.	Garrett Newkirk M.D.
28. J. B. Mitchell, D.D.S., M.D.	1. H. P. Dole, D.D.S. 2. A. L. Gobin, D.D.S. 3. H. P. Dole, D.D.S.	E. A. Balloch, A.M., M.D.	A. Curtis, M.D.		A. J. Brown, D.D.S.	28.		A. Curtis, A.M., M.D.		E. D. Willaston, A.M., M.D.	Wm. H. Hall, D.D.S.
29. H. W. McLauchlin, M.D.	1 and 2 W. H. Jarboe, D.D.S. 3. W. Hinkle, D.D.S.	T. E. Carmody, D.D.S., M.D.	H. W. McLauchlin, M.D.		H. F. Hoffman, D.D.S.	29.		W. L. Smedley, Jr D.D.S.	H. D. Ingersoll	Timothy Leary, A.M., M.D.	
30. F. G. Wheatley, A.M., M.D.	1. W. E. Eccles, D.D.S. 2. A. E. Hall, D.D.S.	T. M. Bryan, A.B., M.D.	B. H. Birrell, D.D.S.		F. A. Dalsberg, A.B., M.D.	30.		E. J. Moss, A.M., M.D.		W. C. Woodward, M.D., LL.M.	
31. R. Dayton Hall, A.M., M.D., D.D.S.	1. W. Brown, D.D.S.	W. D. Webb, M.D.	L. F. Davis, M.D., D.D.S.		C. A. Hawley, D.D.S.	31.		C. M. Grayhart, D.D.S.			
32. H. J. Gies, D.D.S., M.D.	1. N. Broomell, D.D.S. 2. W. Shorr, D.D.S. 3. W. McKeel, D.D.S.	E. B. Gleaves, A.M., LL.D.	H. J. Smith Ph.G., M.D.	G. E. Pfahler, M.D.	H. W. Shorr, D.D.S.	32.	J. N. Broomell,	Steven Egbert, A.M., M.D.	G. E. Pfahler, M.D.		
33. J. S. Cryer, D.D.S.	1 and 2 W. A. Trumble, D.D.S.	C. H. Nash, D.D.S.	E. R. Tirrell, D.D.S.	Ren Buchanan, M.D.	B. F. Schwartz, D.D.S.	33.		B. F. Schwartz, D.D.S.		E. L. Mayer,	
34. S. Sullivan Ashe, Historian, M.D.	D. F. Mee, D.D.S., M.D. Edmund Frank Ireland, D.M.D.	C. A. Verbrugh, A.B., M.D.	J. Rotter M.D.	C. A. Verbrugh, A.B., M.D.	R. S. Williams, D.M.D.	34.		G. V. Simpson, M.D., D.D.S.	Basil Shanklin, M.D.	R. P. Spencer.	J. M. Patterson, D.D.S.
35. Louis Franchere, D.D.S.	1. G. A. Goodreau, D.D.S. 2. L. A. Hollis, D.D.S.	S. Dubeau, B.S., M.D., D.D.S.	A. Bruschamp, M.D.	Guy Lotshaw, M.D.	G. H. Kent, D.D.S.	35.	J. A. Duhamel, M.D.	E. Dubeau B.S., M.D., D.D.S., L.D.S.		G. A. Marois, A.M., M.D.	
36. F. J. Lesperance, D.D.S.	1 and 2. W. H. Burgess 3. C. F. Woodbury, D.D.S.	W. L. Shearer, D.D.S.	A. F. Barkard, M.D.	F. J. Despecher, M.D.	W. C. Stahl, D.D.S.	36.	E. H. Bruening D.D.S.		C. Mc. Martin, Ph.B., M.D.	Paul V. Martin, A.M., M.D.	
37. H. H. Sifers, D.D.S.	1. Wm. Lowell McDougall 2. J. M. Hunt, D.D.S. 3. H. H. Sifers, D.D.S.	C. F. Coleman, M.D.	C. F. Coleman, M.D.		J. A. C. Hedgan, D.D.S.	37.		F. R. Kelly, D.D.S.	J. G. Nelson, M.D.	P. B. Waller, D.D.S.	P. B. Waller, D.D.S.
38. H. A. Johnson, A.M., M.D., D.D.S.	1. N. Jay Hall, D.D.S. 2. C. A. Merrifield, D.D.S.	I. H. Goltman, M.D., D.D.S., LL.D.	J. F. D. Watkins, B.A., M.D. 2 R. E. Haskell, DDS		W. E. Lundy, D.D.S.	38.		J. D. Tomeo, D.D.S.		Raymond Morrison, A.B., LL.B.	1. H. C. Hushing, D.D.S. 2. H. E. Haskell, D.D.S.
39. H. C. Ingle, D.D.S.	C. A. Lee, D.D.S.	J. M. Armstrong, A.B., A.M., M.D.	2. H. S. Judd, D.D.S., M.D.		D. F. Gaspbell, D.D.S.	39.		T. F. Williams, D.D.S.	G. J. Nosworthy, M.D.	G. B. Grant, D.D.S.	
40. H. O. Hupp, D.D.S., M.D.	1. Geo. S. Cameron, D.D.S. 2. A. W. Thornton, D.D.S. 3. H. H. Dorr, D.D.S.	F. H. A. Baxter, M.D.	J. W. Evans, M.D.		J. B. Morton, D.D.S., L.D.S.	40.	A. C. Goslet D.M.D., D.D.S., L.D.S.			W. L. Ford L.L.B.	
41. W. Xavier	J. H. Hawkins, D.D.S.	E. A. Phillips, D.D.S.	S. W. Mosre, L.D.S.		E. Baskin, M.D., D.D.S.	41.		R. M. Hazlehurst, A.M., M.D., D.D.S.		T. O. Hrvine, M.D., D.D.S.	
42. T. O. Hrvine, M.D., D.D.S.	J. W. Smith, D.D.S. E. E. Cruz, D.D.S.	H. Fly Bay, M.D.			E. Singleton D.D.S.	42.		W. D. Baker, M.D.			
43. A. F. Hudson, A.M., M.D., D.D.S.	1. S. G. Brisbe, A.B., D.M.D. 2. W. E. Maier, D.D.S. 3. G. E. Thornton, D.D.S.	F. W. Woodbury, M.D., L.R.C.S.	F. W. Woodbury, M.D., L.R.C.S.		W. W. Woolbury, M.D., D.D.S.	43.	S. G. Ritchie, B.A., D.M.D.	G. K. Thomson, D.D.S.	F. W. Woolbury, M.D., L.R.C.S.	Frank Woolbury, M.D., L.R.C.S.	1 and 2 Frank Woolbury, M.D., D.D.S.
44. E. C. Ortega, A.M., M.D.	1 and 2 W. P. Cooke, D.M.D. 3. A. J. Hurley, D.M.D.	G. H. Meeks, M.D.	E. L. Farrington, M.D.		E. H. Smith, D.M.D.	44.		G. M. Wright, D.M.D.		F. H. Kisler, LL.D.	
45. A. M. Wilson, A.M., M.D.	1. E. H. Wentzinger, D.D.S. 2. H. H. Hunt, D.D.S.	F. P. Kelly, A.B., M.D.	F. P. Rogers, M.D.		W. J. Brady, D.D.S.	45.		G. C. Frazier, M.D., D.D.S.		J. R. DeForges, LL.D.	J. S. DeForges, D.D.S.
46. D. P. Barnes, M.D.	1. J. S. Walton, D.D.S. 2. A. P. Wade, D.D.S.	C. S. Wile, M.D.			J. R. Walton, D.D.S.	46.		G. M. Black, D.D.S.			
47. E. E. Hume, A.M., M.D.	T. M. Hall H. H. Hall, M.D.	H. O. Miller, M.D., D.D.S.	H. O. Miller M.D., D.D.S.		W. Cavanagh D.M.D.	47.	E. E. Sizer, D.P.D., M.D.	C. S. White, M.D.	E. A. Pierce, M.D.	J. R. Cardwell	J. R. Cardwell

MATERIA MEDICA et THERAPEUTICS	PROS. DENTISTRY 4. Crown and Bridge Work 5. CERAMICS	ORAL SURGERY	ANESTHESIA	RADIOGRAPHY	ORTHODONTIA	COMPARATIVE DENTAL ANATOMY	ORAL HYGIENE	PHYSICAL DIAGNOSIS	DENTAL JURISPRUDENCE	1. ETHICS 2. ECONOMICS

olleges. In case lists were not received, the required data was secured from recent college catalogues. The name of the the name appearing first was taken. Notify the secretary if there be any errors or omissions so that this list may be kept as

J. F. BIDDLE, Sec.-Treas.,
817 Arch Street,
N. S. PITTSBURGH, PA.

PROCEEDINGS

OF THE

Twenty-Second Annual Meeting

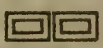
OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

HELD AT

ANN ARBOR, MICHIGAN

January Twenty-Sixth, Twenty-Seventh and Twenty-Eighth, Nineteen Hundred and Fifteen



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American Institute of Dental Teachers

NEXT MEETING, MINNEAPOLIS, MINNESOTA

JANUARY 25, 26 and 27 1916

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LIST OF OFFICERS OF THE AMERICAN INSTITUTE OF DENTAL TEACHERS,

FORMERLY INSTITUTE OF DENTAL PEDAGOGICS

From Date of Organization **Organized at Chicago, August 18th, 1893**

TEMPORARY CHAIRMAN—H. A. Smith, Cincinnati TEMPORARY SECRETARY—J. A. Dale

Annual Meeting	Year	Place.	President.	Vice-President.	Secretary-Treasurer.
1	1893	Chicago, Ill.	D. M. Cattell, Chicago		J. A. Dale
2	1894	Old Point Comfort, Va	D. M. Cattell, Chicago	T. E. Weeks, Minneapolis	J. F. Stephan, Cleveland
3	1895	Asbury Park, N. J.	T. E. Weeks, Minneapolis	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
4	1896	Saratoga, N. Y.	H. W. Morgan, Nashville	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
5	1897	Chicago, Ill.	G. V. Black, Chicago	N. S. Hoff, Ann Arbor	D. M. Cattell, Chicago
6	1898	Cincinnati, O	N. S. Hoff, Ann Arbor	H. P. Carlton, California	H. J. Goslee, Chicago
7	1899	Philadelphia, Pa.	H. P. Carlton, California	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago
8	1900	Nashville, Tenn.	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago	H. B. Tileston, Louisville
9	1901	Pittsburgh, Pa.	H. J. Goslee, Chicago	J. D. Patterson, Kansas City	H. B. Tileston, Louisville
10	1902	Chicago, Ill.	J. D. Patterson, Kansas City	H. B. Tileston, Louisville	W. E. Willmott, Toronto
11	1903	Buffalo, N. Y.	H. B. Tileston, Louisville	H. W. Whitslar, Cleveland	W. E. Willmott, Toronto
12	1904	Louisville, Ky.	S. H. Guilford, Philadelphia	D. R. Stubblefield, Nashville	W. E. Willmott, Toronto
13	1905	New York City	D. R. Stubblefield, Nashville	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto
14	1906	Chicago, Ill.	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto	B. E. Lischer, St. Louis
15	1907	New Orleans, La.	W. E. Willmott, Toronto	Ellison Hillyer, Brooklyn	B. E. Lischer, St. Louis
16	1908	St. Louis, Mo.	Ellison Hillyer, Brooklyn	John Q. Byram, Indianapolis	B. E. Lischer, St. Louis
17	1909	Toronto, Canada	John Q. Byram, Indianapolis	D. M. Gallie, Chicago	Fred W. Gethro, Chicago
18	1910	Washington, D. C.	D. M. Gallie, Chicago	H. E. Friesell, Pittsburgh	Fred W. Gethro, Chicago
19	1912	Chicago, Ill.	H. E. Friesell, Pittsburgh	D. H. Squire, Buffalo	Fred W. Gethro, Chicago
20	1913	Pittsburgh, Pa.	D. H. Squire, Buffalo	Fred W. Gethro, Chicago	John F. Biddle, Pittsburgh
21	1914	Buffalo, N. Y.	Fred W. Gethro, Chicago	H. M. Semans, Columbus	John F. Biddle, Pittsburgh
22	1915	Ann Arbor, Mich.	H. M. Semans, Columbus	S. W. Bowles, Washington, D. C.	John F. Biddle, Pittsburgh

Twenty-second Annual Meeting

OF THE

American Institute of Dental Teachers

MINUTES

The twenty-second annual meeting of the American Institute of Dental Teachers convened at the Dental Building, University of Michigan, Ann Arbor, Tuesday morning, January 26th, 1915.

The meeting was called to order by President Fred W. Gethro at 10:30 o'clock.

Calling Vice-President Semans to preside, the President then read his address (see page 14), which was discussed by Drs. H. E. Friesell, F. B. Moorehead, A. W. Thornton, J. H. Kennerly, and H. C. Miller, Dr. Gethro closing the discussion. The President then resumed the chair.

The Secretary-Treasurer presented his report, as follows:

SECRETARY-TREASURER'S REPORT.

Following the last annual meeting of the American Institute of Dental Teachers, at Buffalo, N. Y., January 27th, 28th, 29th, 1914, the secretary sent out letters to the respective deans of our forty-seven membership colleges requesting complete lists of their faculties, also the names of such members whom they wished to receive copies of our Proceedings. By this means more than five hundred names were secured of persons most likely to be interested in the Proceedings of this organization and copies were duly mailed, besides which, copies were mailed to all Institute College Libraries and to other institutions which had made application for same.

With the Proceedings was mailed a second edition of the "Chart of Dental Teachers" revised to date, also a list of the names and addresses of the members of our faculties. It was deemed advisable, on account of the extra cost entailed to Proceedings by this additional publication, that it be printed each third year, only.

At the beginning of the year, notices were sent to our various schools regarding their wishes with respect to participating in a united exhibit at the Panama-Pacific Exposition. Of the twenty-one replies received, eight were in favor; eleven opposed; two in doubt. Therefore the matter was dropped.

Colleges, members 1914	47
Colleges in arrears 1914	1

Financial Statement.

Carried forward	$725.98	
Dues collected 1914	360.00	
Dues collected 1915	640.00	
Interest, bank account	6.80	
		$1732.78
Expenditures as per ledger	$1008.67	
Balance in bank	724.11	
		$1732.78

Respectfully submitted,

J. F. BIDDLE,

January 26, 1915. Secretary-Treasurer.

The Secretary's report was accepted and the Treasurer's report was referred to the Executive Board for auditing.

Dr. F. B. Moorehead offered the following resolution:

RESOLUTION.

RESOLVED, That it is the sense of the American Institute of Dental Teachers that all colleges holding membership in this organization shall as far as possible announce in their catalogues a period of registration prior to the date of opening of the formal course of instruction, and that the registration shall close on the first day of the course of instruction; and further, that those cases of students presenting themselves after the close of said period of registration be reviewed by the whole faculty and proper recommendations made in the premises for the approval of the State Board of Dental Examiners.

Motion seconded by Dr. H. E. Friesell. Carried.

Dr. D. M. Cattell, Memphis, Tenn., presented "The First Chapter of Operative Technic Booklet." (No discussion).

TUESDAY AFTERNOON

The meeting was called to order by the President at 2:30 o'clock

The Secretary read the minutes of the morning session, which were approved.

Dr. Arthur D. Black announced the recent and sudden death of Mrs. D. H. Squire, Buffalo, and moved that the Secretary be instructed to send to Dr. Squire a telegram of sympathy. Motion seconded and carried.

Dr. Arthur D. Black, of Chicago, read paper on "Suggestions for making the Dental Student a Better Student Dentist" (see page 31). Discussed by Drs. H. E. Friesell, J. H. Ken-

nerly, V. C. Vaughan, H. M. Semans, A. W. Thornton, A. R. Starr, B. Holly Smith, Ellison Hillyer, T. W. Brophy, A. E. Webster, and H. R. Raper, Dr. Black closing the discussion.

TUESDAY EVENING

The meeting was called to order by the President at 8 o'clock.

The Secretary read the minutes of the afternoon session, which were approved.

Dr. Shirley W. Bowles reported that the Executive Board had audited the Treasurer's accounts and found them correct. Dr. Bowles also reported that the Executive Board had approved the applications for membership of the Southern Dental College, Atlanta, Ga., and the Dental School of Marquette University, Milwaukee, Wis. Upon motion, carried, these schools were unanimously elected to membership in the Institute.

Dr. W. E. Willmott, Toronto, presented Report of Commission on Prosthetic Technics (Minimum Schedule) (see page 65). Discussed by Drs. Ellison Hillyer, S. H. Guilford, Abram Hoffman, and N. S. Hoff, Dr. Willmott closing the discussion.

The Secretary read a letter addressed to the President of the Institute by Dr. Eudore Dubeau, Dean of Laval University School of Dental Surgery, in regard to contributing to the dental hospitals established in France, under the auspices of the Red Cross Society, for the purpose of caring for soldiers wounded about the head and face. Dr. Joseph Nolin moved that a committee be appointed by the President to act in conjunction with a similar committee of the National Association of Dental Faculties, to the end that contributions may be solicited for this purpose.

Motion seconded. Carried.

Dr. F. B. Moorehead, Chicago, presented Report of the Commission on Nomenclature (see page 76). Discussed by Drs. R. W. Bunting, Arthur D. Black, D. M. Gallie, Fred W. Gethro, Ellison Hillyer, T. W. Brophy, S. H. Guilford, A. H. Hipple, A. W. Thornton, J. P. Buckley, and C. R. E. Koch, Dr. Moorehead closing the discussion.

Dr. Koch moved, as an amendment to the recommendation made by the Chairman of the Commission, that the matter of funds with which to carry on the work as suggested be referred

to the Executive Board, with authority to provide such means up to Three Hundred (300) Dollars as may be in the power of the Institute to supply and as may be needed, and that the report, with this amendment, be accepted. Motion seconded and carried.

WEDNESDAY MORNING

The meeting was called to order by the President at 10 o'clock.

The Secretary read the minutes of the preceding session, which were approved.

Papers comprising a symposium were presented, as follows:

"Prosthetic Dentistry," by Dr. Herbert L. Wheeler, New York, (see page 90).

"Operative Dentistry," by Dr. A. H. Hipple, Omaha, Neb., (see page 109).

"Crown and Bridge Work," by Dr. A. J. Bush, Columbus, Ohio, (see page 121).

Dr. Wheeler's paper was discussed by Drs. Albert W. Jarman, N. S. Hoff, J. E. Nyce, A. W. Thornton, J. A. Gardner and Fred W. Gethro, the essayist closing the discussion.

Dr. Hipple's paper was discussed by Drs. L. P. Hall and A. W. Thornton.

Dr. Bush's paper was discussed by Drs. M. L. Ward and J. A. Gardner, Dr. Bush closing the discussion.

THURSDAY MORNING

The meeting was called to order by the President at 9 o'clock.

The minutes of the preceding session were read and approved.

Report of the Dental Index Bureau was presented by Dr. J. O. McCall, Buffalo, (see page 140). The report was accepted.

Report of Commission on Text-Books was presented by Dr. Ellison Hillyer and discussed by Dr. J. B. Willmott, (see page 141).

The report was accepted and ordered placed on file.

Dr. N. S. Hoff, Ann Arbor, read a paper on, "Oral Hygiene and The Dental Curriculum", (see page 144). Discussed by Drs. J. D. Patterson, J. D. Towner, A. J. Bush, R. L. Simpson, and W. E. Willmott, Dr. Hoff closing the discussion.

Report of the Master of Exhibits was presented by Dr. E. S. Packwood, (see page 173).

In moving acceptance of the report, Dr. Hillyer recommended that hereafter charge of exhibits be in the hands of a committee of three, one member of which be appointed for three years, one for two years, and one for one year, and subsequently each year one new member be appointed for three years to take the place made vacant by expiration of term of office of the senior member. Motion seconded by Dr. W. E. Willmott. Carried.

On behalf of the committee appointed last year to consider the subject matter of Dr. Williams' paper, Dr. Hillyer, Chairman of said committee, presented report covering the conclusions so far reached, (see page 175).

Dr. J. Leon Williams then read a paper, "Further Consideration of the Relation of Tooth Form to Facial Contour," illustrated by lantern slides, (see page 178).

Dr. N. S. Hoff introduced and moved the adoption of the following resolution:

RESOLUTION

RESOLVED, That the work which is being done by Dr. J. Leon Williams in the effort to secure improved forms of artificial teeth meets with the hearty approval of the American Institute of Dental Teachers, and we recommend that this work be continued until all forms of artificial teeth in use are produced in the best manner known to the art.

Motion seconded and carried. Whereupon the resolution was declared adopted.

Dr. Williams' paper was discussed by Drs. H. E. Friesell, A. W. Thornton, G. H. Wilson, N. S. Hoff, and Ellison Hillyer, discussion being closed by the author.

Dr. H. E. Friesell moved that the committee on Dr. William's paper be continued, with Dr. Hillyer as chairman, and that said committee be instructed to co-operate with Dr. Williams in any way desired and report to this body next year. Motion seconded. Carried.

Report of Commission on Operative Technics was presented by Dr. E. D. Coolidge (see page 198). Discussed by Drs. A.

W. Thornton, H. M. Semans, H. R. Raper, A. E. Webster, W. H. O. McGehee, W. E. Willmott, N. S. Hoff, and H. E. Friesell, the Chairman of the Commission closing the discussion.

Dr. H. R. Raper moved that the recommendation made by the Commission on Operative Technics as to the minimum requirement in operative technic work, be adopted. Motion seconded. Carried.

It was moved by Dr. W. E. Willmott that the name of Dr. Harry P. Carlton be placed on the list of permanent members. Motion seconded. Carried,

Dr. Ellison Hillyer then moved that the names of Dr. L. M. Waugh, formerly of Buffalo and now of New York, and Dr. A. G. Friedrichs, New Orleans, also be placed on the list of permanent members. Motion seconded. Carried.

On behalf of the Executive Board, Dr. Bowles reported that the next meeting of the Institute would be held at Minneapolis, Minn., the last week in January, 1916.

Dr. Bowles further reported that the Executive Board had acted favorably upon application for membership of the School of Dentistry of Loyola University, New Orleans, and moved that said school be elected member of the Institute. Motion seconded. Carried.

Election of officers for the ensuing year then took place, as follows:

President, H. M. Semans, Columbus.

Vice-President, Shirley M. Bowles, Washington.

Secretary-Treasurer, John F. Biddle, Pittsburgh.

Dr. Arthur D. Black, Chicago, was elected member of the Executive Board to fill the place made vacant by the expiration of term of office of Dr. Shirley W. Bowles, the membership of the Board now standing as follows:

A. W. Thornton, Montreal, one year;

Russell W. Bunting, Ann Arbor, two years;

Arthur D. Black, Chicago, three years.

Dr. H. E. Friesell moved the adoption of the following resolution:

RESOLUTION

RESOLVED, That the Institute tender a vote of heartiest thanks to the University of Michigan and to the officers and students thereof who entertained the members of the Institute last evening, for the many courtesies extended during this meeting. Motion seconded. The resolution was adopted by unanimous vote.

The minutes of the session were read and approved.

In introducing the President-elect, Dr. Willmott said:

"Mr. Chairman, Members of the Institute: The association has seen fit to elect a President to whom we all can look up. Dr. Semans, the President-elect."

The retiring President, in surrendering the gavel to President Semans, said:

"President Semans, in entrusting this gavel to your care I would like to make extended remarks, but this is unnecessary, for I know you will be taken good care of. I congratulate you."

President Semans made response, as follows:

"Dr. Gethro and Members of the Institute: Dr. Willmott is correct. You will have to look up to me, and I can drop bricks on your heads if you don't behave.

"For the coming year we have a most excellent Executive Board, which is going to present to us at our meeting next year an innovation, one which will, I believe, excite great interest. I shall not give you any suggestion even as to what it will be, for there is not time. But you will know soon enough, and I am sure it will cause a great deal of interest and no doubt a large attendance at Minneapolis."

Dr. Thornton moved that a vote of thanks be extended to the retiring President for the very kindly, generous, and efficient manner in which he has administered the duties of his office. Motion seconded and unanimously carried.

Adjourned.

ADDRESS OF WELCOME

DR. HARRY B. HUTCHINS, PRESIDENT OF THE UNIVERSITY OF MICHIGAN

This is a novel place for me, but yet a pleasant one. Never before have I been honored with an opportunity to speak a word to a dental association.

I desire to assure you that I appreciate the privilege of welcoming you to the University of Michigan and of extending to you the freedom and hospitality of the Institution. You are here as our guests. Please understand that this word of welcome is not merely formal; it comes from the heart. We are proud of our College of Dental Surgery and of what it has done. We are proud also of what the profession of dentistry has done.

In a way it is unfortunate that you are here at this particular time. This is the period of examinations in all Departments of the University except this one. In order that you might see the Dental Department in its every-day attire, its examinations have been deferred until after your meeting. As you go about the campus, you will notice a quietness and a hush that is unusual. It is the hush of the examination period, a period of intense study and mental agitation.

With these words and with the assurance that you will always be welcome at the University of Michigan and with the expression of the hope that your meeting may be a profitable one, I might take my seat. However, I wish to add that I appreciate as do all educators, what is being done in the field of dentistry in the way of advancing scientific knowledge and scientific preparation. The dentists, with the physicians, are extending the boundaries of human knowledge as are the members of no other professions. Dentistry is today a real profession. It is a profession founded upon a scientific basis. Your attitude is the proper one. It is the scientific attitude. It has been a pleasure to observe your steady advancement, not only in the way of increasing the requirements of admission to dental colleges and extending the technical courses therein, but also in the cultivation of the scientific spirit. I need not say in this presence that your field is a most important one. You know, I am sure, that you have the hearty co-operation of university authorities in your great work. I trust that your meeting may be a pleasant one and that it will result in pushing farther the good work that you are doing.

Again congratulating you and assuring you that we are glad to have you here, I beg to express the hope that your gathering will be full of profit.

RESPONSE TO THE ADDRESS OF WELCOME

DR. B. HOLLY SMITH, BALTIMORE.

I understood the Chairman to say that I would deliver something. I have noticed that the express companies are very much more certain than they used to be to deliver at a less cost anything that is ordered to any address, because of the Parcels Post. I think competition on this matter really ought to prevail in our association.

The warm words of welcome that have been offered to us by the President of this magnificent institution, go down into

my heart and stir me to feelings of appreciation, especially after I have seen this city. I have always thought Ann Arbor, especially "Ann," was the worst child I knew in the family; and then when you come to talk of "Arbor," that little thing we regard as a grape protection or something of the kind. I didn't know anything about this institution before coming up here. Jonathan Taft, a former dean of this Institution who worked with me for years used to talk about the wonderful things here, and when he did I gained interest in Ann Arbor and especially in the dental department. I know Hoff very well but Hoff, I think, does not yet exactly rank with Johnathan Taft, who made history for dentistry. And I don't know, but now that I've been here, Mr. President of the University, and Mr. Chairman, and have looked over this splendid equipment I absolutely think that this is a splendid exhibition and a fine opportunity to have our men who are teaching dentistry, come and take notes on this fine institution. I remember when I was in Stockholm, Sweden, I went in company with others to a swimming affair. There I was introduced to a very pleasant young woman, in swimming togs. She stood at the top of the stairs and went out on a spring-board, and said, "Come out in the water, it's fine," and then she leaped out about forty feet and went down in the water, came up, and said, "Try it." Well, now, that is about the position of myself here.

Mr. President, you have had the experience of presiding at meetings and offering these addresses of welcome—why, really, you ought to be mayor of a great city, addressing everybody and telling them how welcome they are, and saying it so sweetly and pleasantly. I can't follow you, sir. You tell us that at this time of the year examinations are going on and that consequently there is a quietude in such an exalted atmosphere, the exhilaration that I feel, coming as I do from rather humid atmosphere, is intense. But, as I was going down the street, two girls came along with a "Hip, hip, hooray,"—I heard that all the way through. And so there is a spirit and feeling of exhilaration. There are no examinations going on here, if examinations make quietude, Mr. President. It is a misfortune that anybody should be misinformed about that matter. I suppose that you understood it that way, but it can not possibly be true.

I want to say more seriously, gentlemen, that it is a splendid thing to come here to one of the chief fountains of education in our procession, to get in touch with its officers and managers,

the men who control its affairs and have to do with the management of a great university. I wish I were president of a university! I have been teaching in a privately owned dental college and have had to stand all of the odium and opprobrium that is attached to that sort of thing. I have refused to acknowledge it all the time and will for a long time to come, but honestly now, before I die I am going to write on a piece of privately owned paper and put it where it will be found, that I am sorry I was not president of a university.

There is an inspiration that begins right here. The President said something about his heart. Well, now, we don't want to brag at our time of life about our hearts. I show a bottle that I carry with me, and I have only had that now,—(A voice: What is in it?) That is nothing but nitro glycerine. I don't know at what moment of time it may explode, but I know that at our Frat banquet at the last meeting in Rochester the President had in his pocket a bottle just like that and when he needed it, it failed him. Do you carry a bottle, Mr.President?

Gentlemen, I will not detain you longer. I want to thank the President of the University for his kind words, and to apologize for my levity.

PRESIDENT'S ADDRESS

DR. FRED W. GETHRO

I believe I am expressing a truth when I say that this association is one of the most important if not the most important dental organization in existence. This being true, it then evolves upon your chairman to present something of sufficient importance to warrant the attention and deliberation of this teaching body.

Before directing your attention to this paper, I want to take this occasion to express to the members my full appreciation of the honor you have given me. I think I realize the full import of this office, for as just stated, I am of the opinion that this organization wields the most important influence over the future of dentistry. The object of this association should be to develop and improve methods of teaching, to teach men what to teach and how to teach, to inspire teachers, especially the younger men to continued and better work. For one reason or another the older men are continually leaving the ranks and their places must be taken by the younger men. The mission of this institute should be the same as every dental faculty, to con-

tinually prepare the younger men for these higher and more responsible positions.

It is hardly necessary for me to refer to the success of this institute. When we consider that this association has only been in existence about 20 years, and then consider the place which it now occupies in moulding dental affairs we may well marvel at its wonderful progress. A most cursory examination of the constantly improving program, to say nothing of the wonderful increase in attendance bears every evidence of a most remarkable growth.

Certainly the wonderful advances made by this association during its short existence of 20 years presents a history of progress which we might well review with considerable pride, but the great opportunities of the present and the future are so marked that your chairman cannot even touch on all the advanced topics, to say nothing of dealing with our glorious past.

It has occurred to me that I might with advantage, allude for a moment to one of the most important events of the past year. The consummation and formal opening of the wonderful Forsyth Dental Infirmary in Boston to my mind, marks one of the brightest spots of dental history. It is a pity that the war news so congested the press of the country that practically no account of this auspicious occasion reached the public. I am of the opinion that this wonderful institution, presenting as it does, such opportunities for public education together with well equipped laboratories for dental research work will eventually have a marked influence on dental education.

There are some minor points that are deserving of consideration, and among them is the ten day clause for receiving students. It is, in my opinion, simply an invitaton for a certain percentage of the class to come in on the proverbial eleventh hour. It works a great disadvantage, because it is useless for the teacher to attempt any serious work, until that period is over. If all our schools would publish a statement to the effect that all students must be in attendance on the opening session, and all our schedules started on that opening day, there would be very few coming in late. I would not have you understand that I would prevent a student from entering a dental college after the opening date. On the contrary, I claim it is a great injustice to exclude a good student—one presenting a legitimate excuse—from entering even later than the prescribed limit. Each of these cases could and should be judged on its merits. I hold

that a capable student who has been delayed by sickness having a bona fide physician's certificate of such illness, should be received even though the applicant came in later than the twenty day period. We do not say that a student who is sick cannot remain out more than 20 days during the school session, so why should we designate the number of days a student may be out by sickness at the beginning of the session. I have put this question up to a number of prominent men in colleges other than dental colleges and they have all said that such a ruling seems ridiculous..

May I suggest that you give some attention to the publishing of catalogues, to the end that there shall be more uniformity in our curricula. My reasons for this suggestion will be understood by giving you the result of a compilation of the various catalogues. I need only call your attention to the chart of subjects and teachers, published by the institute some two years ago to illustrate my point. According to that chart, which was made up from the official catalogues of the schools, either one or both of the following conditions were true. First—either dental colleges were doing more teaching than they claim, even to teaching subjects that are not included in the catalogue, or else they have been very deficient in not including some very important dental subjects. As an illustration, the subject of Dental Anatomy was only taught in 75 per cent. of our schools. Radiography and Comparative Dental Anatomy were taught in 30 per cent. of our schools. Physical Diagnosis, according to the catalogs, was only taught in 10 out of some 50 dental schools. The strange part of this is to follow. According to the recent chart, which was corrected by the deans of the various colleges, 22 were teaching Physical Diagnosis and yet one may diligently search the catalogues and find only 5 that give any definite hours on this subject. Five others only mention Physical Diagnosis. In other words, 37 of our colleges do not teach Physical Diagnosis. Is it any wonder that we are severely, and I might add, justly criticized by many educators, especially members of the medical profession? Let us look to it that our catalogues show just what subjects we include and just how many hours are devoted to each subject.

There is a very evident lack of balance in the curricula of the dental schools. If you have any doubts as to the truth of this statement, let me quote a few of the results obtained from a very careful compilation of all the dental catalogues. Perhaps a

few words in explanation of this work will be best given at this time. I have taken twenty or more recognized subjects, for instance, Anatomy, Physiology, Chemistry, and made a separate book for each subject. The pages in each book are numbered from 1 to 47 in accordance with the numbers given on the back of the Institute stationery, each number representing a school. Everything pertaining to each subject was dissected out of the catalogues and arranged in proper order on one page in this subject book. After that was done I had everything that was given on the teaching of each subject, even to hours and texts, in one book. The hours and books were tabulated and we may now compare the total hours of all the schools.

TABLE OF HOURS

The following table of alphabetically arranged subjects has been made from the various dental catalogues and gives the lowest and highest number of hours devoted to each subject, showing a variation ranging as high as 1700 per cent.:

	Hours
Admissions	From 3 years H. S. to 2 years College
Anatomy	64 to 764
Anaesthesia	10 to 64
Bacteriology	24 to 272
Chemistry and Metallurgy	144 to 555
Comparative Dental Anatomy	16 to 32
Dental Anatomy	30 to 426
Dental Jurisprudence Ethics and Economics	
Dental Pathology	30 to 112
Histology	32 to 360
Materia Medica and Therapeutics	35 to 256
Operative Dentistry	192 to 2970
Operative Technics	96 to 600
Oral Hygiene	8 to 96
Oral Surgery	32 to 794
Orthodontia	12 to 206
Pathology	16 to 120
Physical Diagnosis	4 to 32
Physiology	30 to 288
Prosthetic Dentistry	192 to 2284
Radiography	5 to 60
Text Books	(Required) 2 to 19
Text Books	Cost from $29.75 to $68.90

In looking over these tables you will notice that a great percentage of the colleges are given as hours uncertain. I have gone over these catalogues so designated many times and it is simply impossible to even guess at the time given to the various subjects.

The following are but a small part of the ambiguous statements taken from the dental catalogues. One college teaches a certain subject in "morning hours;" another "one-half days;" another "one hour part of second semester;" another "during part of year;" another has so many "conferences;" another "Fridays for two hours." One college does not teach Dental Anatomy, but I find a course in "Nutrition of Children" and another course on "Diseases of the Ear, Eye, etc." Another gives "Thirty-five lectures and Seventy-five meetings." Another college sets forth that "the class will meet three times a week throughout the year." Another gives a fairly extensive course;" another "Part of session." Another says "There are two lectures twice a week throughout the session," and another gives "Two periods a week during the first part of the second term." one catalogue gives Noyes' Dental Anatomy; another gives Broomell's Comparative Anatomy—books that do not exist.

I am well aware that the mere publication of subjects or courses of study does not necessarily imply the actual carrying out of such courses. Nevertheless it is a fact that the publication of a schedule setting forth the various subjects, the hours spent on each, etc., is of decided advantage both to the school and student body. I believe that each school should publish on one page of its catalogue a complete table of the subjects and hours.

I can hear many say that there is not sufficient time to include the various subjects that should be included in our curriculum—this I admit is all too true and this brings me to the last point I desire to make and I think the burden of this paper. According to your chairman's opinion, an opinion gained after carefully consulting our dental catalogues, and from an extended correspondence with many of the foremost educators of the country, also numerous others interested in dental education, the time for taking an advanced step in the dental curriculum by going to a four years' course is now at hand. There are at present several states that have laws ready to present to their respective legislatures, calling for a four years' term of dental school education. I recognize that this is not a legislative body and that its work has been most harmonious, probably due to a large extent, because it is not a legislative body; but this is purely a teaching proposition and we must consider it from that point of view. It is undoubtedly true that any conclusions reached here will be put into effect by the proper authorities at an early date.

There never was a period in the history of dentistry when there was greater opportunity for advancement than is presented to us today. There never was a time when one could find as much good reason for optimism as now. There is at the present time a genuine wave of dental education going all over the country. If we should review the activities of the various medical and dental organizations, all over the country during the past year, we would be astonished at the rapid increase of mutual professional interest between members of the medical and dental professions.

You are all familiar with the quotation so frequently used from Dr. Mayo's able paper read some few years ago in which he said, "The next great step in medicine should come from the dental profession, adding, Will they do it?"

DISCUSSION

Dr. H. E. Friesell, Pittsburgh

The President, in his teaching methods, uses as one of his important mottoes to his students, "Be thorough—be thorough in everything you do." And we see in the thoroughness with which Dr. Gethro has gone about the preparation of this address a personal exemplification of one of his principal mottoes.

I heartily agree with the President in his estimate of the progress of the Institute and of the value of the work that is being done by the association in its meetings and through its encouragement and influence in many other directions. The table of hours which he has read to us and which is so astounding in some of its features, is only another indication of the need for a far-reaching survey of our teaching work, the need for establishing a standard minimum curriculum—the need really for a total reorganization of our teaching methods and for a four years' course. The President has recommended the adoption of a four years' course, and I am pleased to inform this association and those members of it who are not members of the Faculties' Association, that last night at a meeting of the latter association the four years' dental course was adopted by a unanimous vote to take effect beginning with the course 1917-'18. (Applause) The probabilities are that quite a number of the schools will adopt the four years' course beginning with the term of 1916-'17. That action has been recommended by the Dental Educational Council of America and by the Na-

tional Association of Dental Examiners, I believe, and by a number of State societies whose laws are at present being changed to accord with the advanced requirements.

In one portion of his address the President called attention to one or two schools in Pennsylvania which require only three years of high school work for admission, conditioning the students on one year which they were permitted to make up in the course in order to complete the total four years' requirement. Of course, he got this from the catalogues issued last year. For his, and for your information I would say that the Bureau of Public Education in Pennsylvania made a rule, which our dental law gives it authority to do, that after January 1st, 1915, no dental school in Pennsylvania could accept a student short of four years' high school preparation, with no conditions whatever. The Iowa State Board has passed the same regulation—four years without conditions. Therefore, the situation in Iowa is also corrected.

The Dental Educational Council and the Faculties Association have both adopted a recommendation in regard to another matter and one to which the President has called attention, namely: The 10-days' admission clause. This is a rather difficult problem which we have inherited from past conditions in dental education. How we are to overcome it I am not certain that I know. There is such a lack of uniform control over these things—we have rules, but control and rules are different things—there is such a lack of uniform observance of the rules that are in force, and this with the probable variations in the excuses that would be accepted as reasonable, makes the problem rather serious. And yet ten days—five per cent practically of our whole year's teaching course—is thrown away in the first part of the term because you can not begin your work until all your students are in. You may make an attempt at it, but every teacher knows that he has to go over that work again and he is no further ahead at the end of his time than at the beginning. The medical schools have also had this trouble, and I do not know that they have solved it either.

We might follow the method that is in force in the undergraduate schools, or perhaps in some of the graduate schools of the various universities, and that is to reserve a period for registration prior to the opening date, which means practically opening ten days before you say you open, or two or three days, whatever this period may be. Now, if a university having two

or three thousand students can open on the morning of the first day of the actual term with all classes in full swing, we ought to be able to do it in dental schools.

One factor of decided importance in the speaker's estimation is this: What disposition is to be made of this library of books that the President has gone to a great deal of trouble to prepare? It is a valuable thing. While I hope we can do it, I do not see how it will be possible to include it in detail in the transactions of this association, and yet at the same time it is too valuable to be lost. And before closing my remarks I want to put in a bid with the association, since this has become its property, that if the Institute can not use the library it donate it to the curriculum committee of the Dental Educational Council, for it would help that Council out very materially in an important work in which it is engaged.

I wish to compliment the President most heartily upon the thoroughness with which he has done this work, and upon the breadth of vision that he has demonstrated in making a literary survey of the dental schools. It is an excellent address and comes at a most opportune time.

Dr. F. B. Moorehead, Chicago

There are three items in the President's address upon which he invites specific discussion: First, the ten-days' clause; second, the curriculum; and, third, the extended course. And I will limit myself to discussion of these three items.

1. I thoroughly agree with Dr. Friesell with reference to the ten-days' clause. The ten-days' clause has been a very unfortunate element in our school work. I believe that every college man, and particularly those college men who are associated with administrative work, will agree with this statement: That during this ten-days' period, very little definite constructive educational work is done. And the suggestion that Dr. Friesell makes is excellent: To have a prior registration period of ten days in which all students are expected to register. And not only that, but I would add to this requirement of registration, that the students would be expected to have their equipments purchased and examined before the work began. Quite as bad as the ten-days' clause is that associated evil of students coming to the institution without any preparation in the matter of

equipment, and going into the technic classes and into the laboratory classes without any equipment whatsoever; without any information as to what they will need.

All those things should be attended to beforehand and the student ready to begin his work properly on the day the course opens. And I think we might adopt a ten-days' period of registration before the opening of the course, and then have registration closed with one exception, that exception to be made on vote of the faculty and approval of the state board of dental examiners of that state. There might be some cases in which hardship would be worked by not permitting a student to come in because he came twenty-four hours after the registration closed. And, therefore, those exceptions ought to be surveyed by the faculty, and, on recommondation of the faculty, approved by the state board of dental examiners in the state where the school is located. That would take care of the pernicious effect of the ten days' clause, and would rule out the question of police authority exercised by the state boards in making a ten days' clause.

2. The curriculum. It is perfectly obvious from the President's splendid work that many schools have been very careless in the preparation and publication of their catalogues. If one could examine the course of instruction in any particular school, he would perhaps find a better condition of affairs in the classroom and in the actual working schedule, than he finds exhibited in the catalogue. But I think every school should publish in detail absolutely every course it offers. The descriptions ought to be definite and conclusive. If one were to examine a catalogue from a wholesale house, he would expect to find every item explained in detail. That is the function of a catalogue. Every item of the curriculum should be explained in detail in the catalogue. And this brings up, as Dr. Friesell suggests, the necessity of a minimum standard of curricula in our colleges of dentistry.

I want to digress just a moment and speak of one or two things which I think ought to be mentioned in this connection, because the President has cited as a specific illustration the question of physical diagnosis. And this is in a sense an explanatory statement. Physical diagnosis is a composite term, and so one might put "physical diagnosis" in his catalogue and mean one thing, another man put it in his catalogue and mean quite another thing. Physical diagnosis has in it "clinical di-

agnosis," which is a vastly more important subject than physical diagnosis per se, but what is usually meant by "physical diagnosis" is simply a course of lectures with perhaps demonstration of topical examination of the body including examination of the body including examination of the heart and lungs. To my mind, that is of little consequence to the practioner of dentistry, or of any specialty of medicine. Clinical diagnosis is of vastly more importance. By that is meant the examination of the secretions and excretions of the body. In many of the dental curricula you will find on close examination that clinical diagnosis is cared for as it should be in various laboratory courses. For instance, in a course on general pathology consideration is given to the subject of changes in the heart and vascular system, when the blood would be studied, and the blood examination made in a natural sequence, where it belongs. And the same thing is true of urinalysis. When the class reaches the subjection of lesions of the kidney and urinary system, they then take up the question of urinalysis, and it comes in logical sequence. The student gets urinalysis as he would not be able to get it in an isolated clinical course.

The students in our school study physical diagnosis in the laboratory courses in bacteriology and general pathology. And that is where it belongs. In a curriculum of that kind you perhaps would not find any specific statement of physical diagnosis, but if you will read a description of courses, you will find definite prescriptions for clinical diagnosis.

The same is true of anaesthesia. A great deal has been said as to the importance of teaching the administration of anaesthetics, but I think its importance is limited in practical application as well as in theory, to discussion and demonstration of local anaesthesia and nitrous oxide gas anaesthesia. So far as both physical diagnosis and general anaesthesia are concerned, apart from nitrous oxide, the students should be made intelligent on the subject. It would be a misfortune to attempt to put in the dental curriculum a course in physical diagnosis which would entrust to the dentist the responsibility of going out and making clinical diagnoses. Also you would miss the time on more important subjects. Moreover, the practioner of dentistry is not and never can be qualified to make a thoroughgoing analysis of the blood and urine. The thing we ought to do in these courses is to encourage each man when he goes out into practice to intimately associate himself with the best in-

ternal medical man in his community and work with him, and he will accomplish much more than he would to attempt, in a very inefficient manner, the making of clinical diagnoses in the practice of dentistry.

No dentist can be competent to make an accurate urinalysis, and if he cannot make an accurate urinalysis, it is wrong to make any urinalysis. It is dangerous to make one that is not conclusive and definite.

So our work in these courses should be carried on with the view of giving the student an intelligent grasp of the subject of general anaesthesia, the importance of having made in certain cases a competent clinical diagnosis, to recognize the danger signs, to see the gross aspects of disease, and then for final analysis to depend on a man specifically trained to do that type of work.

The subject of anaesthesia belongs to the course of surgery, and belongs no place else. It is a part of the teaching of surgery and should be taught by that department. The subject of anaesthetics is taught in three places, and may be covered completely without any specific statement to that effect in the catalogue. First, in the course on Materia Medica, where it belongs in its first consideration; second, in the physiological laboratory, where it also belongs, and, third, clinically, in the course on surgery. And a school may have a very comprehensive presentation of a well rounded course in anaesthetics that does not appear specifically in the catalogue. The more we can limit the number of departments and make them comprehensive, the better off we are. Make your chair on surgery responsible for the things that properly relate to it, and in that department have as many able men as you need. Oral Hygiene for example belongs to Materia Medica and Therapeutics. The multiplication of departments is a dangerous thing. We ought to limit our departments and make them more comprehensive, but logical, of course. There is a deal of danger in simply saying,—We are going to have a course on Dental Anatomy, therefore we will establish a chair of Dental Anatomy; we are going to have a course in Oral Pathology, we will make a chair of Oral Pathology. This ought not to be. There should be in the catalogue a chair of Surgery and Pathology, which shall include Bacteriology and all correlated subjects, and one department head properly related to all sub-departments. Then you have a working unit worth something; then you may correlate and make your teaching effective and you have not half

a dozen men firing off guns loaded with different kinds of ammunition. You do your students harm by such a method. They say, "Dr. So-and-so teaches such a thing about Pathology, another man another thing—what shall I believe?" He is confused, he ought to be, for the department is not properly organized in the first place.

In each department there should be staff meetings at which a discussion of the teaching element and unit may take place. The personality of the teacher should not, of course, be lost sight of, and should not be curbed. But there must be an organized unit of the elements which belong in one department. And for this reason I believe the department of Materia Medica and Therapeutics ought to cover Oral Hygiene and Prophylaxis in order to make the instruction a working and constructive unit.

3. I have not the courage to talk about the extented course. The President has given a very excellent, able presentation of this. However, I wish that he had taken up a more thorough consideration of the extended course of instruction and had simply given all his time to that.

The question of extension of a course in educational work is as wide as are human interests. The best thing about this whole matter, viewing it from every angle, is this: That it is just an expression of ordinary progressive evolution. It means that the men of the dental profession, and, more than that in its significance, the individuals composing the laity also, are demanding a different type of dentist. And the thing that you and I have got to face, face dispassionately as statesmen if you please, is the fact that we must prepare for day after tomorrow, a different type of dentist. And this means a different type of preparation of the man who comes to us in order that we may be able to make a different type of dentist. We are not going to change the type very much by simply putting a little appendix on the present course of instruction. We will have changed the type tremendously when we shall have changed the type of man before he comes to us.

Dr. A. W. Thornton, Montreal

While I was sitting beside my friend, Dr. J. B. Willmott, consciously or unconsciously he indulged in a characteristic habit of his of "thinking aloud," and he said before the discussion started at all, "I wonder if there is a time limit!" I will try to keep within the time limit.

First of all I desire to allude to a somewhat peculiar condition. For some years I have taken an interest in psychic phenomena and have followed somewhat closely the reports of the British Society on Psychical Research. And I am free to confess that until five or six weeks ago I had never come in contact with anything that I could label as a true psychic phenomenon. But about that time I received a letter from the President of the Institute, and this was the first sentence: "I am going to ask you to take part in the discussion of my address at the coming meeting. Thank you for saying yes." Of course, it was the psychic or astral body that had received the reply from me. Unfortunately he added another sentence, saying: "I will send you a copy of the paper in due time." But the astral body did not recognize the limitations of the human body with its fleshly habiliments, and I did not receive the paper until this morning. A few minutes will, however, serve in this instance, because I think the address requires no discussion. It appeals strongly to all of us.

"What and how." It is true that this association has a good deal to do with saying what to teach, and, to some extent, how to teach it. But the fact that there is a technic room really conveys very little idea to teachers as to how to teach. They may go into a room and stand before a class, but be absolutely unable to inspire that class. After all I think we talk too much about technic and too much about the practical part of the work. The only thing we can do is to teach our students to become independent thinking machines. Until men as teachers have some idea of pedagogical principles, as teachers finally they will be somewhat of a failure. Poets may be born and not made, but teachers must be made as much as dentists must be made. And the great lack in our schools is men who can teach and men who will teach. Unfortunately we are not able to teach men how to teach.

In the second paragraph the President has made a significant statement: "It is always necessary for me to refer to the success of this Institute!" And I thought of this Institute and what it has meant to dental education, and asked myself, Why has it been a success? And as I look back over the past ten years I thought of the men who had presided over its meetings, controlled its destinies, and shaped its progress, and said to myself: "This association is a reflection on the men who have been at the head of the Institute." I was reminded of an article

in a paper, in which appeared a description of a copy of the Constitution of the United States, and in writing this out the work had been so peculiarly shaded that standing out from the parchment was a picture of George Washington, the man who made the Constitution of the United States possible. And so as I reviewed, in the light of the statement referred to, the work of this Institute and considered the great success it has achieved I thought: This is a reflection of all the men who have been instrumental in controlling its destinies and shaping its course.

Reference was made to the Forsyth Dental Institute. Truly it is a wonderful philanthropy, and yet I think some mistakes have been made even in that, as mistakes are made in everything human. I was there a year ago, and already those in authority have realized that, while it may inspire rich men of the world to follow in the steps of the Forsyth Brothers, to some extent it is a failure. I believe the ideal plan is that which is being followed in the city of Toronto. There, thirteen dental clinics have been established in the public schools, dental relief is afforded in each one, and the school children can go to these without losing time and without being obliged to spend carfare. If we as teachers could have something to say in directing the philanthropies which make these things possible, I believe that in this plan we would find the greatest success.

Some time ago I read a little article in regard to the question, "What is truth?" And the statement was made that truth is that only which in the highest and best sense of the word ultimately filters down to the lowest man, woman and child in the whole community. So the truth in dental education will become most potent for good if in the final analysis it gets down to the men, women and children of that type which comprises a very large proportion of the population of any community.

In regard to the time limit of entering. I think that the point was well taken, and yet we must add a day upon which we will say,—Beyond this day no one can enter the course during this year, for the very simple reason that so much of the work has been covered that it is impossible for the belated student to keep up with the class. In that connection the suggestion made by Dr. Moorehead is a good one—that any such case of delinquency in arrival at the school be referred to the faculty and that they determine whether or not the applicant shall be admitted. We had this year the case of a boy who came for the fourth year, but came too late. He had a medical certificate,

given, however, twenty days before it was presented, saying he had been dismissed from the physician's care. We would not admit him. Unfortunately this method puts in the hands of medical men the power to say whether an applicant for admission shall be permitted to enter beyond the time, and there is somewhat of a tendency to stretch the truth just a little in order to facilitate matters of that kind.

With reference to the four years' course we have nothing to say, because our course has always covered four years. But the question of dental education at large is, I believe, one of the largest propositions in the world today. It would be very unseemly if a British subject, in a country absolutely neutral during the present time, should say anything provocative of international discussion, and I shall not do it. But two years ago one of the belligerent countries at the present time, Austria, put a law through making it compulsory for every man, woman and child to have mouth conditions attended to. They are recognizing the matter as a basis upon which the general welfare of the whole country might rest. So I believe the time is coming when every country as well as Austria will recognize the importance of mouth conditions. Just at the present time it can not be denied that no one condition has caused so many rejections for military service as bad mouth conditions. In many of the men already enlisted the mouth conditions were deplorable. Before Christmas we opened our clinic two nights every week from half past 7 to half past 9, for soldiers, who were sent down under escort. We had all the way from 25 to 75 soldiers at our clinic every night. The matter of mouth hygiene is one of national importance. And the most comprehensive methods of dealing with those conditions in order to bring the greatest good to the greatest number, are after all comprised in the great work of this society.

I congratulate you, Mr. President, on the splendid address you have given. As I thought of the men who have presided in the past, and then looked at the President with his genial, generous, and gentlemanly bearing, I said,—"After all the men who preside here do not belong to a decadent race."

Dr. J. H. Kennerly, St. Louis

I am very fortunate in the fact that I am to follow the three gentlemen who have already spoken, because that matter has been discussed from entrance requirements to the present war existing on the other side of the water,

and it does not seem that there is anything left for a man to discuss. So I feel that the best thing for me to do would be to sit down and close the discussion that way. However, a friend said to me this morning when I came in that I couldn't go to a meeting of this kind without talking, and I do not like to prove him a prevaricator.

One particular point in the President's address which appeals to me is the ten-days' admission clause. It appeals to me, as probably it does to every other teacher here, owing to the fact that, as has been stated, the work can not be taken up as it should be until all the students are in their places. Since the organization of the state board in the state in which I live, they have insisted upon the ten days' clause. However, some few weeks ago the board in the State of Missouri saw fit to extend this clause to 60 days, which to my mind only adds confusion. In the case of a man going to school for 60 days and then finding out at the end of this period that he has not the necessary preliminary education, I would like to know what is going to become of him. If the man has not the necessary preliminary education within 10 days, he is not very apt to secure it in 60 days, and for that reason I am very much impressed with the particular introduction of this clause.

Reference was made to the various units required for matriculation in the different states. In my state we have 12 units for conditional matriculation. It is a matter with which the state board has absolutely nothing to do. Unfortunately there can be but one interpretation placed upon it, the interpretation the law places upon it, because it is written in the statutes of the state and the board has no authority to make any changes. The only possible way it can be changed is by legislative enactment. Consequently when the President refers to schools in certain states having 12 units of credit for conditional matriculation, they are simply complying with the state laws under which the institutions exist.

We are told furthermore that last night, at a meeting of the National Association of Dental Faculties, a four-years' dental curriculum was adopted, tentatively, and that we will in 1917 begin a four years' course of instruction. Of course, there are many opinions as to what that course of instruction shall be, and I think just at this time the less discussion we have on that particular point until Dr. Black's paper is read, the better. But the same thing reverts to our state laws again. Dr. Frie-

sell states that in several of the states bills have been prepared for presentation to the respective legislatures for the purpose of changing the present laws. If these measures are enacted into law, a certain number of the states will require, say, 15 units of credit for matriculation. Up to this time only one of our states has required, unconditionally, 15 units for matriculation, and that is Illinois. Beginning with January, 1915, there are one or two others. Now, with the adoption of the four years' course, the same thing prevails. In our state, for instance, the law says that we shall require only 12 units of credit for conditional matriculation. I for one would be delighted to see it made 15, unconditionally. But there is always a mercenary motive, or a life and death struggle in certain localities that compel certain schools to adopt the lowest possible requirements, for if they exceed the limit set by the law it means the death of the institution that adopts it.

With reference to the 60 counts I will simply say that the 60 counts required in the State of New York and I believe subsequently in the State of Pennsylvania, amount in the end to the standard four years' high school course, which is 15 units of credit, so I am informed by the secretary of the Educational Council of the State of New York.

I hope and believe that when Dr. Black's paper is presented and discussed we shall have thrown open to us some very excellent ideas concerning the distribution of the four years' course that may be.

Dr. H. C. Miller, Portland, Ore.

Regarding the period of registration, or ten days' limit for admission of students beginning with the present session, October 1st, we arranged for a three days' registration period and announced that students were expected to assemble and transact the preliminaries to entrance during those three days, September 28, 29 and 30 and that the lecture courses and as many of the laboratory exercises as could be started would begin October 1st, the first day of the term. I can assure you that the number of matriculants entering late and taking advantage of the ten-days' period was largely done away with. I believe that if our schools would announce a three or a four-days' registration period, and the students be required to present themselves during that period for their assignments of lockers, seats, positions in laboratories and

all of those things necessary to be taken care of, the trouble will be practically eliminated.

Dr. Gethro,
Closing the Discussion

I have here the entire results of the compilation of these books in practically one paper, and if any of you care to look at it you can very quickly verify any of the statements made. I do not think it is necessary to take any more time with this particular subject. I might say a good deal, but this again would have to refer to the books. If you will look at some of the subjects you will see that a teacher takes possibly two, three, or four subjects. You may scan that material, and in some of the books you can not find reference to more than one or two of them. They may have a heading that includes some of the other subjects, but there is not any material matter in that heading that will refer to the others. What I would like, of course, would be to see something really definite in the catalogues.

SUGGESTIONS FOR MAKING THE DENTAL STUDENT A BETTER STUDENT DENTIST

DR. ARTHUR D. BLACK

Study is the basis of professional progress. The preparation of this paper was undertaken with the special object of presenting a criticism of the work of our dental schools and of making suggestions pointing toward the development of better students both before and after graduation. It is our first duty to pay our respects to those men, from Hayden and Harris down to the present day, who have contributed to the wonderful progress which has been made in dental education. Therefore, while we shall today suggest the abandonment of certain methods in vogue for many years, this is done, not as a reflection upon the men of the past, but rather as a compliment to their work in preparing the foundation which today makes further advance possible.

The dental practitioner of today is, with a few exceptions, the product of our present system of education. May we not scrutinize him and find some basis for changes in school methods which will tend to make the future practitioner more what

we would wish him to be? May we include in this study a consideration of the newer problems which confront the dentist of today? What indication is there in these for changes in methods of teaching?

An almost world-wide propaganda on oral hygiene has increased enormously the demand for dental service. The outcry of Hunter against oral sepsis has brought the medical profession to a realization that mouth conditions are responsible for many serious secondary lesions, together with a demand for dental service of a higher type, which requires men of broader and better education. In considering the principal objective which our schools should have—of preparing men to serve best the dental needs of our people— we are confronted with the urgent need for more dentists and an almost imperative demand for better educated men. In determining upon the course to be pursued, we should not overlook the fact that the men graduated today must not only meet the problems which now confront dentistry, but also solve those more intricate questions which are certain to be present in future years.

We must realize that the dentist graduated today without having been taught to study, will not be equipped to keep pace with the progress of events; he will be no better dentist ten, fifteen or twenty years hence than he is the day he graduates, and I fear that many will retrograde rather than progress. The development of the habit of study is the most important training that can be given in the dental college course. It is of much less importance *what* a man learns in dental school than *how* he learns. If we could teach all of our students how to study, it would not make very much difference what they knew of dentistry when they graduated, as they would be so trained that they could master the problems which confront them.

Our present graduates are generally not the type that can handle the problems of the future with credit to the profession. Our dental schools have now about recovered in number of students from the advanced requirements established in 1907. Are we to answer the call for an increased number of graduates of the present type or shall we undertake, at some reduction for a time in the number, to prepare men who will be more nearly able and inclined to develop a dental service which will best protect the health of our people and win for us the confidence of the medical profession.

The startling revelations of the past few years establishing the interdependence of mouth and general systemic conditions have served to impress prominently the need for dentists of broader education. We certainly should have the same mental grasp of the activities of the human organism in health and disease as do men practicing many of the other specialties. The dental profession is today utterly unable to comprehend the studies of medical men as they relate to our special branch which appear in the literature of the past few years, because they have not had the training in study necessary for this purpose. There is ample evidence of a lack of ability to select and use the essential facts in dental literature, without considering the more complex problems involving the dental field with which the medical profession is now so much concerned. These require a broader and more thorough knowledge of the foundation studies upon which medicine rests. According to announcements of our various dental schools, we are teaching these subjects, but we must admit that the dental student has not been sufficiently impressed with his need for this knowledge after he graduates.

We must develop a new type of dentist. There must be a new dentistry, just the same as there has been in process of development a new medicine. The new dentist must be essentially and especially a man who thinks; whose principal service will be mental, rather than mechanical. The most important change in our teaching must be that which will train our men to think, to study, to analyze, to compare and to draw proper deductions.

There are presented two lines of improvement:

(1) In the men who enter the schools, controlled by the entrance requirement and its enforcement; (2) In the training during the school course.

There is no argument of the general proposition that the better educated the man before he enters the professional school, the better student will he be. Men with a full college training would undoubtedly be preferable to men who have had only a high school education. In whatever proportion college training might be added to the entrance requirement will the type of student be improved. Unfortunately conditions seem to be such that it is impractical to advance our entrance requirement to even one year of college work at the present time, as the reduction in the number of students would be too great. A closer

definition of the present entrance requirement, with certain units specified as obligatory, together with a more rigid enforcement, will improve the general average of matriculants.

It is fair to presume that we are getting a different type of high school graduates in the dental school as compared with those who enter medical school. The medical students are as a class, men who are anticipating a considerable book training, while those who choose dentistry are more mechanically inclined, and look with disfavor upon those courses which require long hours with text books. This is due, in a large measure, to the influence of present dental practitioners. Those who commonly advise the young man to go to dental school, also impress very strongly upon him the utter foolishness of spending several hundreds of hours in study of Anatomy, Histology, Chemistry, General Pathology, etc. Not until the rank and file of the dental profession have come to realize the need of the broader education will the majority of matriculants in dental schools come without prejudice against such studies. Therefore, we should use our influence at every opportunity to change the attitude of the profession in this respect. It would seem that the type of man who presents at the dental threshold is not susceptible of a sudden change, but that he can be improved only very gradually as a natural process of evolution.

If it be necessary that we continue with the present entrace requirement, we may improve the school product by more effective teaching, by lengthening the course, or by both. Teaching may be made more effective as the teachers are more interested and earnest in the work assigned to them. There is doubtless room for much improvement in every school in this respect.

The most important change herein suggested is the substitution of a recitation system of teaching for the present lecture and quiz plan. The larger the school the more beneficial will be the change, yet it seems to be the most needed change for all schools. The possibility of such a plan has come to us only within the past few years as the number and quality of our text books for dental subjects have increased. The recitation plan is necessarily based on text books for each branch which cover the subject in a manner satisfactory to the head of the department; so that he may consider the students' knowledge of the subject sufficient for the school requirement when the contents of the book have been reasonably well mastered.

Then for all schools, no matter what the number of students, each class should be divided into sections of twenty or twenty-five, and instead of lectures, an equal number of recitation hours should be scheduled for each section. The course for the entire year should be definitely planned, the subject being divided into the proper number of hours. Accurate records should be kept of both the attendance and recitations of each student, and promotion should be based principally on this record. A series of written quizzes and mid-term and final examinations should supplement the recitations.

Under the present lecture and quiz system, the student may learn little or much as he may be inclined, and yet pass the examinations by a few days' cramming, possibly with only quiz compends. In a quiz of an entire class of fifty or more the chance of not being called upon will be taken by most students too often for their own good. Real study, if we may call it such, is likely to be limited to a few weeks of each year.

Under the recitation plan, with sections of twenty or twenty-five men, each student will be practically certain beforehand that he will be called upon at every recitation hour. He also knows that promotion depends on his attendance and recitation record, consequently he must be with his books practically every evening if he is to earn promotion.

The most important advantage of this change should be the effect in developing the future student dentist. If a man is trained during three or four years to get his knowledge from books; to spend his evenings with them, to have them for his constant companions, instead of having all of his information poured in from a rostrum, or crammed in under examination pressure, he will have learned to depend on books, and will be more likely to use them in the future.

The substitution of this recitation plan by the small school presents difficulties. The larger the school, the greater is the problem of securing qualified teachers. In the larger schools it would probably be out of the question for most teachers to increase the time devoted to school work sufficiently to hear each section personally. They would necessarily superintend the teaching and rely upon associates to assist with the recitations. However, it seems likely that we might attract a better class of men for this service than has generally been possible for demonstrators, as the hours need conflict very little with office practice. One could hear two recitations before ten or

ten-thirty in the morning, or after three-thirty or four o'clock in the afternoon, and the college connection, together with the remuneration which might be paid, should be sufficient to attract good men. For foundation branches, it is probable that a considerable number of senior medical students or recent medical graduates would serve very satisfactorily.

This change is suggested with a full appreciation of the magnetism and eloquence of a limited number of men who seem to have been created with the ability to command and hold the attention of an audience under almost any conditions. A school should not deprive its students of the valuable teaching of such a man, but let not too many of us think that we have this power. Neither is it desirable that a class, as such, should lose its identity. A schedule may be so arranged that the bulk of the teaching will be by recitation in small sections yet permit of lectures to the entire class as may seem desirable in each subject. The determination in this should be based on the conditions surrounding each subject in the particular school. In some subjects one lecture a month might be given, in others no lectures at all. Some subjects may be best taught almost entirely in the laboratory. As a general rule, however, the head of the department should meet one section of the class, while his associates meet other sections, and there should be a regular progression, so that each student would have an equal number of hours with each teacher.

There is another very advantageous feature of this plan: That there would be one or several men in training in each department who would have earned promotion when a vacancy might present.

The same principle should be applied to laboratory instruction, the sections being as small as can be arranged. A thoroughly equipped laboratory, which will accommodate a small section, will afford the opportunity for more effective instruction than will be possible with a large section, even though the number of instructors be in the same proportion to the number of students.

The sectional plan in both recitation and laboratory permits the arrangement of a more elastic schedule; it also makes it possible to utilize the building space to better advantage. There may be recitations in the same subjects at different hours, or on different days, but in regular order, giving the opportunity to vary the schedule of individual students to meet unusual

conditions. This would apply especially to students who transfer from one school to another, or to cases in which a student is required to repeat a single subject in which he may have failed and which might otherwise interfere with his advanced schedule. In many schools, certain large laboratories are used but two or three half days per week. With the sectional plan, the small laboratory may be in use practically all the time. It makes it possible to teach more thoroughly a larger number of students in a building of given size, but will undoubtedly materially increase the cost of the instruction.

In clinical instruction, every effort should be made to secure the highest possible efficiency in team work between the head of the department, his recitation assistants, and the demonstrators. The central idea in this should be to tie everyone connected with each department to the chosen text covering clinical procedures, and to insist upon the utmost respect from teachers in all other clinical departments. Each assistant should be impressed with the necessity of subordinating his personal ideas to those of the head of the department. Such team work is absolutely essential to effective instruction. If the requirement in each clinical subject could be the completion of a certain minimum of work of a specified grade of excellence, without setting a maximum, the general average of quality should be materially improved.

If it were possible to have the recitation masters in clinical subjects also act as demonstrators, it would seem to be an ideal plan, but I think this will generally be found to be impracticable. While there are some very notable exceptions, the man who is willing to take as much time from his practice as would be required for both recitation and demonstrator service, would generally not be desirable. Careful study should be made of the proper balance of technical work to study hours. The present schedules of many dental schools are entirely too heavy to give students sufficient hours for study and reflection. Much time is wasted as a result of insufficient instruction in laboratory and clinic. If the laboratories can be well equipped for small sections, with better instruction, the time now provided in the schedule may be materially reduced, while the amount and quality of work will not be diminished.

Every conceivable plan should be undertaken to interest students in independent reading; to familiarize them with dental and medical literature. Ample space should be devoted to

a reading room and every effort should be made to build up a good library and museum. The student is likely to be impressed with the importance of books and study in accordance with the space and convenience provided. The leading dental journals and several of the better medical journals should be available on the library tables. Students should not only be encouraged, but required to do reading outside of the regular school courses. Several chairs may call for short theses on assigned subjects. This year our former short course of lectures on dental history has been expanded into a lecture a week during one semester on dental literature and history, in which the writings on various subjects, as well as the contributions of selected men, will be reviewed. This is a new feature which we believe to be very much worth while.

It seems to be the concensus of opinion that dental schools will require a four years' course in the near future. There is much diversity of opinion as to the best curriculum for such a course. This is due in considerable part to the conditions in which each school finds itself. A few seem to desire the addition of a full college year to precede the present dental course, while many prefer the addition to the present course of a full year in dental subjects. I will present the view of the faculty of which I am a member, with the expectation that other plans will be presented in the discussion.

Our preference lies in what, for want of a better name, we have called the split course, to consist of a four years' dental course, into the first two years of which will be incorporated the studies of the first year of the College of Liberal Arts.

Under this plan we would accept students for a four years' dental course, with the present preliminary qualification of high school graduation. Freshmen would spend four half days each week in the College of Liberal Arts, and would have English and Mathematics (or a science) as their principal studies. In the dental school they would devote the remainder of their time to basic studies for medicine and dentistry, with one dental technical subject, such as a recitation and laboratory period in operative or prosthetic technics.

Sophomores would spend also four half days each week in the College of Liberal Arts, taking a language and a science as their principal studies. In the dental school the basic studies would be for the most part completed, and a single technical recitation and laboratory course in dentistry would be given.

The Junior and Senior years would be much the same as at present.

Stated differently, the freshman year of the present three years' course would be divided, and half of it would be given in the freshman and half in the sophomore year. The freshman year of the College of Liberal Arts would be similarly divided and the dental students would take half of it during their freshman and half during their sophomore year. There seems to be several points of advantage in this plan. The dental student would have training by the teachers and association with the students in the department of liberal arts during two years and would complete the full freshman requirement in the college. During both years he would receive training in dental technic and would thus be developing in finger skill. This feature would be a distinct advantage of this plan over that in which a year of college might be required for entrance. The time now devoted to basic studies could be extended sufficiently to materially increase the teaching of these, making them closely if not fully parallel with the same courses in the Medical School.

It is believed that the plan suggested for the first two years will eliminate a number of students now entering dental schools, because they would find the study requirement too heavy or incompatible with their preconceived ideas that dentistry is mostly mechanical. The men who will satisfactorily complete these two years will, as a result of this training, approach the more strictly dental subjects of the following years with the expectation that much study will be required; they will have learned to depend on books in school work and will be more likely to do so in future practice.

The expansion of the present dental course over four years would tend to bring about little change in the type of student or in his viewpoint of the dental school and the profession. If we cannot have a different type of matriculant, he must undergo a metamorphosis during the dental course, and it is felt that the year of college given as a part of the dental course, will be even more advantageous than a year of college as a preliminary requirement.

It seems hardly necessary to mention the fact that there would be little reduction in the number of students under this plan—the entrance requirement being the same as now—as compared with the proposition of requiring a year of college preceding the dental course.

As has been suggested, the conditions confronting each school will modify the course which it will prefer. The "split course" proposed, will be more acceptable to a dental school situated on the same campus with a liberal arts department, than to a dental school situated possibly in a different city or having no university connection. It is believed that most schools could arrange to meet such requirement without too much inconvenience to their students.

It is hardly within the scope of this paper to discuss regulations, but there is such a close relationship between schedule and the regulation or law which may govern some of the schools in the near future that a suggestion may not be out of place. A four years' dental course should be required, which will specify a schedule of a minimum number of hours for each of the various subjects, also that a certain minimum number of these hours or subjects must be given during each of the four years. Such a rule would give each school some latitude in the matter of adding strictly dental or liberal arts courses to the present schedule.

We should look forward to the day when dentistry will become in the fullest sense a specialty of medicine. It seems very probable that there will be a change in medical instruction by which a definite general course will be required previous to schools or courses in each specialty. It is to be hoped that by the time of such change the teaching of the basic studies in our dental schools will be so nearly the equal of that in medical schools that we can discontinue the teaching of these studies in dental schools and stand with the other specialty schools ready to receive all of our students from among those who have had the general medical training. We will then have better dental students and better student dentists.

DISCUSSION.

Dr. H. E. Friesell, Pittsburgh, Pa.

Naturally one can only be delighted to find that many of his views in regard to the present conditions in dental education and the visible requirements, harmonize with those of so eminent a teacher as Dr. Black. When we contrast what has been required in the way of education of the dentist in the past with what we can, from the perspective of dentistry, plainly see will be required in the future, we realize that we are facing today an important problem in dental edu-

cation. We recall what certain eminent teachers of medicine have said. For instance, Dr. Osler called attention to the fact that we have control over only the first four inches of the alimentary canal and practically none over the remaining thirty feet, but that by controlling the condition of the first four inches of the canal we are enabled to prevent many of the pathologic conditions that otherwise would affect the other thirty feet of the alimentary canal. When we consider the work that Hunter has given us on oral sepsis, the work of Billings, Rosenow, Hartzell, and others of the profession touching on the sequelae of mouth lesions, in the light of the statement of the eminent surgeon Mayo that the next step in medicine must be taken by the dental profession, can not we as teachers realize that unless a very decided re-arrangement of our teaching methods is brought about in the near future, the medical profession will necessarily be pointing the finger of scorn at the dental profession for its inefficiency and inability to handle the requirements that it is facing?

Is there such a thing as a dental "student?" That thought has often occurred to me. I believe that the percentage of real students to be found in the various dental schools of the country is very much smaller than we would like to acknowledge. But this fact is not wholly to be blamed upon the student himself. Much of it can be attributed to an unintelligent application of the dental curriculum. Our methods today in most cases tend to discourage study on the part of the student. The statement of the essayist that a large proportion of applicants for entrance to dental schools is made up of men who are looking for a calling that is principally mechanical, is true. And when you ask prospective students of dentistry the question:—What is there about dentistry that attracts you? Why have you selected it in preference to some other profession?—many of the applicants will tell you frankly, "Well, I don't like to study and for that reason do not want to take up medicine, I don't like mathematics, I am not interested in engineering, and it seems to me that dentistry does not have so much book study in connection with it; it is more mechanical, I have some mechanical proficiency I believe, and therefore dentistry will suit me better." Considering that a student in that frame of mind comes to us, what do we start him on in the study of dentistry? We at present have a three-years' course that is over-crowded, with numerous subjects, and with all this we are still not getting the kind of dental education that is necessary today, the

kind that will be necessary for the men who are graduated from our schools in the next two or three years because demanded by the public and the medical profession.

What we need, then, is an amplification of our present course by the addition of certain subjects that the essayist states can ordinarily be provided in the first year of a college course. This will necessarily require the extension of our course to include a fourth year. By including in the first year certain of these general subjects, as, for instance, college physics, chemistry, and biology, the pressure in subsequent years upon other subjects closely related to them will be to a considerable extent relieved. The transferring of dental anatomy and about half of dental prosthesis to the freshman year would bring about further easing in the three later years of the course, with the further advantage that the student would thereby secure the technical training and acquaintance with strictly dental subjects, in his freshman year. By adding college physics, chemistry, and biology to the first year, the student will be given a training in these subjects that will undoubtedly overcome the existing difficulty generally recognized in acquiring an adequate knowledge of Anatomy, Physiology, Histology, and Pathology. Where possible, it is desirable that the study of these subjects be pursued in the department or college of liberal arts under the same discipline and requirements as to study, etc., as those governing the undergraduate student in the arts and science courses. This will give the dental student in his freshman year contact with the university students, teachers, and methods in the general course, which will, perforce, cultivate good habits of regular and carefully checked study and preparation work which will be of inestimable benefit to him in his dental subjects in subsequent years.

Technical drawing also should be added to the dental course, because later on we are requiring him to draw many things and we have not taught him how to draw.

A re-organization of our curriculum that will permit us to concentrate the students' attention upon a few subjects at a time, and to complete the fundamentals in the sophomore year, is advisable. This arrangement permits of sufficient concentration upon these fundamental subjects, which is pedagogically desirable, and also makes it possible for the student to take the state board examination at the end of the second year in all these fundamental subjects, which will overcome one of the

greatest problems facing us at the present time in dental education.

The subdivision of classes into sections and the adoption of the recitation system, is an admirable plan, but it will necessitate a definite assignment for daily study in the preparation work that is done outside of school hours. This will demand the possession on the part of the school of an ample dental library. And this brings us up to the point that, in order to make full and comprehensive use of a dental library, it is necessary to have it properly indexed, and we come back again to a thing that we have been nursing along in the Institute for a number of years—the Dental Index Bureau. We saw five or six years ago that this was necessary and we have been trying to have it carried through to completion. Every year something turns up showing us how desirable this dental index is. It seems to me it is up to each one of the members of this association to subscribe for at least two memberships in this bureau in order to assist in putting it into workable shape so that when we are prepared to teach dentistry as we should, we shall have the equipment with which to do it.

In practically all its statements the paper is in harmony with the trend of affairs that have occupied the three associations which have been meeting here during the past week. It would seem that they all not only recognize the imperative needs in dental education, but demonstrate a spirit of willingness to meet such requirements that is both admirable and encouraging.

Dr. J. H. Kennerly, St. Louis

In attempting to discuss Dr. Black's paper I am confronted with so much that is of vital importance in dental teaching and to the dental profession just at this time when so many educational bodies are demanding a change in the long established ways and methods of teaching, also so much with which I, and I feel sure you, must all agree. It is absolutely true as he says "The dental practitioner of today is, with a few exceptions, the product of our present system of education," and we must all agree that some change must be brought about in our system of teaching whereby the dental graduate of the future may be made a better dentist. Not particularly in the technical branches of dentistry, but in the broader field of the various sciences which do go, and should go, to make up the sum total of the profession of dentistry.

I am lead to believe from years of study and observation that technically speaking we are educating our students today to a very high degree of proficiency. This must be proven to a considerable degree by the exhibits made at this meeting by the various members of the association. Furthermore, it has been proven by the fact that so many foreign students come to our schools. For what purpose? Do they not almost invariably make the assertion, that their purpose was to learn the technique of dentistry which is taught in this country as in no other? Then, if we have advanced to such a high degree in the technical part of our profession, is it not time to begin to give more attention to the strictly scientific part of it? How many of us are fully aware of our lack of scientific training and are willing to acknowledge it.

Not long since, while listening to a lecture before one of our dental societies by a very learned physician on "Some Phases of Medicine in Relation to Dentistry," the audience sat enwrapped with what the speaker had to say, and while he was telling them of some of the lesions which he attributed to dental causes, he was at the same time asking for enlightenment from the dentist as to how to avoid these lesions. Only a few, a very few in that large audience could give him a satisfactory answer to the question asked. Why? Because of the lack of a broader scientific knowledge of the cause of the many lesions which manifest themselves in the oral cavity. The recognition of this fact is what induced the essayist to write the interesting and valuable paper to which we have just listened. Then, if we fully realize this to be a fact, should not the next step be in the direction of adopting some means by which this defect in our system of education may be eliminated? Just how this is to be done there will be divers opinions and ideas advanced.

The essayist says that "our present graduates are generally not a type that can handle the problems of the future with credit to the profession. Our dental schools have now about recovered in the number of students from the advance requirements established in 1907. Are we to answer the call for an increased number of graduates of the present type, or shall we undertake, at some reduction for a time in the number, to prepare men who will be more nearly able and more inclined to develop a dental service which will protect the health of our people and win for us the confidence of the medical profession?" To this query I say, by all means, reduce the number of students by increasing the requirements which will give them a broader

foundation on which to build their professional education. We had far better allow a number of people to suffer on account of lack of proficient professional services than to continue to furnish uneducated dental service to the general public. And, I repeat that this should be done as speedily as possible, for we all realize that the longer we procrastinate in a movement of this kind the harder it is to consummate our desires on account of the diversity of interests involved in such a change.

We must, however, as the essayist says, "develop a new type of dentist. There must be a new dentistry, just the same as there has been in process of development a new medicine. The new dentist must be essentially and especially a man who thinks; whose principal service will be mental rather than mechanical. The most important change in our teaching must be that it will train our men to think, to study, to analyze, to compare and to draw proper deductions." No one will disagree with him when he says "that there is no argument on the general proposition that the better educated the man before he enters the professional school, the better student will he be." He is also absolutely correct in the further statement that "it is fair to presume that we are getting a different type of high school graduate in the dental school as compared with those who enter the medical school. The medical students are as a class men who are anticipating a considerable book training, while those who choose dentistry are more mechanically inclined and look with disfavor upon those courses which require long hours with text books. This is in a large measure due to the influence of present dental practitioners. Those who commonly advise the young man to go to a dental school also impress very strongly upon him the foolishness of spending several hundreds of hours in the study of Anatomy, Histology, Chemistry, General Pathology, etc. Not until the rank and file of the dental profession have come to realize the need of a broader education will a majority of matriculants in dental schools come without prejudice against such subjects." This statement has been verified with me time and time again. When placing before the student a list of the text books required, I have frequently been asked as to whether it were necessary for him to purchase the entire list of books. Being assured that it was, he would inform me that some former student had told him that it was not necessary because he personally had gone through school without buying any text books. And, unfortunately, this opinion seems to have fast hold upon very many students.

Concerning the substitution of the recitation system of teaching for the present lecture and quiz plan some will say that we have had this plan in operation in some subjects for some time and the reason it has not been more largely used in our institution is because of the lack of a text book on the subject satisfactory to the head of that department. We are now trying to adopt this plan in every instance where it is practical to do so and hope to be able to report our success at a future meeting.

Concerning the value of a well equipped library available for the use of students, I wish to say that I know of nothing that is of more practical value and which would have a greater tendency to induce the student to read and investigate so much as the placing at his disposal a library full of interesting works of dental literature.

For the past year or more we have heard and read a great deal about the extension of the dental course to four years and there seems to be a very decided opinion in favor of such a change. Just how or what that change shall be is one which will require a vast amount of work to determine. As I said in the early part of my discussion that I believe that the technical training of the present day teaching is sufficient for the time, it seems all important that the extension of time should be devoted to strictly scientific subjects instead of the addition of more technical subjects. The idea put forth by the essayist of what he terms "a split course" certainly has many advantages to my mind over the simple addition of one year in strictly dental subjects. However, as in the ultimate consummation of his plan we find one year of college work, it seems best to me that when the proper time comes that instead of splitting the first two years as he suggested, that it would be decidedly better to demand of the matriculant a year of college work based upon certain sciences which are absolutely demanded by the profession, an outline of which may be determined by a Committee appointed by either this association or some other body to which the dental schools are amenable.

We have, as we all know, two types of dental schools. Those directly controlled by the universities of which they are a component part, and the others which have no university connections. Consequently, there will be two interests to conciliate and I realize that it will be a very difficult matter to make an advance in our system of teaching which will demand as much as one year of preparatory college work. The only way that

I see that this matter can be brought about is by an amendment to the state laws of the various states requiring that a man have a preliminary education equivalent to one year of college work. I know full well that there are some present who will not agree with the ideas I have advanced on this subject, and I expect before we leave here there will be an immense amount of discussion on it, which I hope will eventually result in great good to the dental profession. However, be that as it may, make whatever change we may, let it be the effort of every man here to devise some means by which we can induce our students to appreciate more the value of the text book while in school, hoping thereby to induce them to continue to be students after they have graduated.

Dr. Victor C. Vaughan, Ann Harbor, Mich.

Dr. Black was kind enough to send me some days ago his paper, and I read it with great interest, and was especially interested in the proposed split course. That strikes me as a very good thing, I think that it would be better than requiring one year in a literary school for preparation. It would be better for these reasons: In the first place you could dictate exactly what the student should take in the literary or arts course. I do not want to be misunderstood upon this point, but I think that I am justified in stating that in our best universities in this country, in the so-called literary department, students are not worked hard enough. There are too many lines of least resistance. The elective system has done much to destroy good scholarship. The student takes a certain subject till he finds he doesn't succeed very well in it, when he says, "I have no aptitude for that," and drops it at the end of the semester and goes to something else. Of course, he fails there just the same. The number of hours of work required in our best universities in the literary department does not furnish enough work to keep any intelligent man busy. Sixteen hours are all that are allowed, and when you pick out courses, which may be passed with very little reading, long continuance in such a school does much to destroy good scholarship. I am thoroughly convinced of this.

By having the split course as Dr. Black has proposed, you can dictate what the work shall be, and, could I advise the dental teachers, I would say to mark out distinctly what should be given in these two years during which the course is split, and I would make it good, tough work. No number of years spent in

the literary school, unless the student acquires the habits of earnest study, fits him for any profession. I do not want to be personal. I argued this point many times with ex-President Elliott of Harvard. He held that a student, to enter one of the professional schools of Harvard University, must have a bachelor's degree—it didn't make any difference what he studied in the literary department, he must have the degree of B. A. before he entered, for example, Harvard Medical School. And for some years that was the case. And what was the result? The graduates of Harvard Medical School fell down before state examining boards, not because they did not have good instruction in Harvard Medical School, but because they did not have the fundamental knowledge when they entered Harvard Medical School. And now Harvard Medical School has changed its requirements for admission from a bachelor's degree, which might mean much and might mean little (and generally means very little), to a two years' college course in which certain subjects are prescribed.

I think that the split course would be a good thing for another reason. Now, you may think this a very queer reason, but I have been teaching in colleges since I was 16 years of age, and you can imagine that has been a long time. I believe that the average boy who is going to amount to anything wakes up some morning between the ages of 18 and 21, the exact time varying with the boy, realizing that he must do something in life. By this split course you would have the professional incentive going back to the boy in the literary department, stimulating him and causing him to realize that he is doing something which is fitting him for his life's work. I think that is a great thing; I believe it to be a great stimulant.

So I would recommend that you try, and I am sure it will be a success, the course that Dr. Black has recommended, for I think the idea is a splendid one, pedagogically and practically. And I would require during those two years a pretty thorough knowledge of college physics, of biology, of chemistry, both inorganic and organic, qualitative and quantitative. No man is likely to do scientific work in after life (there are exceptions, of course) who does not get some taste of it in his early days either in school or elsewhere.

I also like the recommendation of the library and having students use books. There is a big difference between having books and having students use books—a big difference. The only way that you can make students use books and know how

to use books, is by compelling them to do so. We are all naturally lazy, we all follow the lines of least resistance and get along as best we can—that is human nature. And so far as I know the only way to drive the student to consult books and to look up the literature of a subject, is by compelling him to write a thesis. I am sorry that this method, which was formerly practised very largely both in medical and dental schools, has fallen into disuse. Compel a student to look up a subject, to look it up thoroughly, and if he becomes interested he learns how to go to the original source for his information. In doing so, he often finds that the man who wrote his text-book did not know anything about what he wrote. So I should require frequent theses.

Now, as to the question of recitation and lectures, I do not believe that we can lay down any absolute rule. I think a mixture of recitation courses based upon a good text-book, with some lectures, is the best plan. I do not believe there is any question but we learn more readily through the sense of hearing than through the sense of seeing. Heard things impress us. But at least we should use the two senses in order to get information. The method depends very much upon the teacher. There is nothing more difficult for a teacher to do than to quiz day after day. It is a very burdensome, tiresome thing. I would rather lecture three hours than to quiz one hour. I feel exhausted when I quiz the class for an hour and am always ready to stop.

Another thing, too, that I think we should bear in mind in considering the uplift of any profession, and that is teachers should be strong enough to weed out the unfit. Whatever the requirements you may have for admission to your schools, some unfit will find their way in. And it takes more courage to throw a poor fellow out, especially if his inability is wholly intellectual and he is a good fellow, a nice boy, and doubly so if he is a poor boy and trying to work his way through—it is a hard thing to throw him out. The most heart-rending thing I have to do is to throw out some poor boy who is working his way through college and believes that he is going to be a John Hunter or Louis Pasteur, when he has not brains enough to acquire any knowledge. We must weed out the poor students.

One other thing that I wish to say in conclusion. Students, like all others, estimate the profession more or less, and correctly, by the difficulty of getting into it. I have been here on these grounds for forty years, I have watched all departments and

have been interested in all. The department or the calling that has the highest requirements for admission, and the stiffest course and makes the students work the hardest, gets the best students. They may not get so many, but they get the best. And, if you will pardon my saying so, I believe that this has been one of the criticisms that might be made upon dentistry. Young people themselves look upon it on the whole as an inferior calling, that they can get into it easier, don't have to work so hard. Of course, until recently law and theology have been the easiest professions to get into, and, while I would not say this outside, a lot of dumb-heads have got into each. But now of all the courses, for instance here in the University of Michigan, the dental course and the engineering course are the two, I believe, that have had the lowest requirements for admission.

So I think that, in order to uplift the profession and get better men, we want to set a higher standard. I say this because, while I do not know much about dentistry, I am as deeply interested in the profession as I am in that of medicine, and because I recognize the fact that after all dentistry is a specialty of medicine and the two must go hand in hand, both must succeed together.

Dr. H. M. Semans, Columbus, O.

As I have been asked at the last moment to substitute for Dr. Grieves, and as this paper opens a question of tremendous import, I shall limit myself to only a few remarks. The paper is in part making a new epoch in dental history and has been presented in a masterful way.

With reference to the remark as to the development of habits of study, as I was rounding one of our city corners not long ago I accidentally shaved one of the white lines that indicated a safety zone, and a 6½ foot policeman threw up his hands and said, "Get the habit!" We have all heard that expression many times. A short time ago one of our surgeons told me that while in a neighboring town for the purpose of doing an operation in one of the pretty little hospitals that our towns and small cities are gradually building up and equipping, he had an hour or two to wait, and, noticing a dentist's sign across the street, he went over, walked into the reception room, and found that the dentist was busy in the operating room. He noticed on top of the dentist's desk a few books, stepped up to them and found the American System of Dentistry, 1882, two volumes, Garretson's Oral Surgery, 1888, one volume. Per-

haps the dentist had his library at home, but the doctor said he found but those three books. That man evidently had not "got the habit."

We have to develop the habit of study in many ways. Dr. Black suggests one way. I might add another:— correlate the laboratory and recitation rooms. A few years ago I had occasion to spend a week or two at two or three of our dental colleges in the East, and while visiting relatives I ran across one of the so-called "fresh-water colleges" of New England. I drove over for the purpose of going through the college. We met a mutual friend crossing the campus, one of the teachers there, who said: "Doctor, we are just going into this building; wouldn't you like to come along? We may have something of interest to show you. In our literary work we are teaching somewhat along technical lines as you do, we may, and perhaps do, carry out the work along laboratory lines in correlation with the recitation plan. Come in and let me show you something." We went up-stairs into one of the rooms. There were two sections in History, and I shall never forget the interesting situation. Here was a table a little larger than this (large round table), with a map of England spread upon it. Eight or ten boys were sitting around the table. About the room were shelves of interesting books of history and two or three boys were employed in taking down certain of these books for reference, while one or two seemed to be guiding the others in their work. During that hour they were having one of the events in the Wars of the Roses. As I stepped up to the table one of the boys was writing on a white celluloid flag attached to a large pin, certain data, and as somebody at the end of the table made a remark the boy placed the flag at a certain spot on the map; somebody else made a few remarks, when another boy wrote on a light red flag a few data and placed it at a certain spot on the map. And I do not suppose those boys will ever forget the events growing out of the troubles between the houses of York and Lancaster. At a table in an adjoining room we found a second section of, as I judged, the same class. As I remember they were studying the Central West of Europe, and the battle-field of Agincourt was the topic of conversation. As we left the room the teacher said to me, "Doctor, it seems to me here is a beautiful correlation of laboratory and recitation teaching." And it seemed so to me.

Dr. Black mentions the use of medical seniors and recent graduates in medicine as helping in the fundamentals. With us

this plan has worked out excellently. Being almost, if not quite part of the college of medicine up till the past year, being in the university and still associated as closely as in former times with the college of medicine, we are able to avail ourselves of the opportunity, and I should judge that we have from twelve to fifteen medical students and graduates of one, two and three years' standing, assisting us in four or five of these subjects. This method has been a tremendous help to our student body.

The four years' course interests us very much, and the University Faculty has granted us the privilege of giving a four-years' course starting in 1916. Our faculty of dentistry has talked over a tentative plan, adopting nothing as yet. The College of Liberal Arts is interested in the subject, and we have gone over somewhat the idea presented by Dr. Black, the split course. The enthusiasm I had before coming here has increased wonderfully since hearing the remarks made by Dr. Black and Dr. Vaughan. Therefore, when those of us who are here from our institution go back to Columbus we will take back something that will be of great help to us in our work.

Dr. A. W. Thornton, Montreal

When I opened my program and saw the title of Dr. Black's paper I said to myself, "This is the most important paper, in my estimation as least, that has ever been presented to this association." The title is exceedingly attractive—"Suggestions for making the dental student a better student dentist." I confess, however, to a feeling of disappointment in the paper. Suggestions were made as to the method of making the curriculum include more study, but we have heard no hint, except the one given by Dr. Semans, as to any method that might be employed to cause love of reading on the part of those who did not previously love it. But after all, as Dr. Vaughan said, we move in the line of least resistance. In other words, we do the thing we like to do. What we must do is to get the students to like to read.

As I look at the picture on the wall there I am reminded of an incident I read of some time ago. A man had a very valuable picture which he greatly enjoyed, until an art critic, hypercritical perhaps, came along. In the picture away in the distance was a man fishing, and the fishing-rod was a little bit too long for the distance and the size of the man, the result of perspective. The critic drew the man's attention to the

length of the rod, which spoiled the picture for the owner, he could not look at it without seeing its defect. So it is in literature. If we would teach the men to be students, we must lead the way. As Oliver Goldsmith, in "The Deserted Village," said of the village preacher, he "Allured to brighter worlds, and led the way." We must lead the students.

I was principal of a public school for several years. One day I went into one of the lower rooms where a young woman was giving a lesson in reading, the selection being Leigh Hunt's poem, "Abu Ben Adam." The children were simply saying it over as a lot of words without any conception of what it meant or the beauty of it. And yet if its true meaning and interpretation had been brought to their attention, they would have seen beauty in that kind of literature ever after. So the best we can hope to do is to inspire our instructors to teach their students some of the beauties of literature.

Mention was made of Dr. Osler. You know the enthusiasm he enkindled in the heart of every man who heard him. You have only to read his books to understand the influence which Dr. Osler had on his students. If we are to be instrumental in developing better student dentists, we must teach them something of the beauty of the thing which we wish them to do so that they will love to do it. We do not have to coax them to stay after 12 o'clock when they are having a little dance—no, they will stay up till 2 because they like to do it. And it will be the same when they love to read.

A statement has been made that we frequently hear, and one which I dislike very much—a comparison between dentists and men of other professions. I think it is a mistake to exalt others too highly or to deprecate ourselves too much, because it is my belief that the dental profession is the peer of any other profession. We come in contact with medical men in the schools and colleges who are the picked men of the profession. In the dental profession we meet at our conventions practitioners from various parts of the country, small places as well as large. We compare them with the medical men of the colleges, and it is an unfair comparison. Last week I was in a town where are located several graduate physicians, but there is not a man there that could make a urinalysis, there is not a microscope in the town that is in use by the physicians. A short time ago I was in a crowded place when a man got a little piece of

coal in his eye. And he said to me , "Doctor, I wish you would take this out of my eye." "No, no," I replied, "I haven't anything here to do it with, the physician has sterile cotton and appropriate instruments and he can take it out safely." And I told him of an incident that happened in the General Hospital of McGill a short time before. While a man was on a boat a piece of coal lodging in his eye, a comrade took a corner of his handkerchief and removed the foreign body, and as a result of infection from the handkerchief, the man lost not only that eye, but the other eye as well. And then I said, "Wait till you can have a physician take the foreign body out properly." I accompanied him, the physician took out his handkerchief, rolled it up, and with it took out the foreign body! Don't you believe that the physicians of this or any other country are anything more than human, they are as human as we are. At the same time we must realize that we are a young profession, the world has not yet learned what we are doing. Today dentistry is almost an exact science. We want to live up to it, we want to teach our students to live up to it. But after all we must remember that the great majority of the people are demanding mechanical skill at our hands, and therefore we must teach this, and we must teach the other too, and we must create a high standard. But, men, it is on you the burden rests, it is up to you to raise the standard. But do not teach your students that they are poorer than other men, but the peer of other men. There is an old book which says, "Those who follow on to know, shall know." So we must lead our students to something higher and better, and the time will then come when we shall have the recognition we do not have at the present time.

Dr. A. R. Starr, New York City

I am very much interested in Dr. Black's paper. There are, I believe, many things in it of inestimable good and great importance, but I desire to speak of just one or two points in order that when Dr. Black closes the discussion he may tell us how to overcome some of the difficulties which seem to present in this so-called split method of education.

In the first place, Dr. Black has told us that the school of liberal arts in his university is about 13 miles from the dental department. I would like to know whether he is going to have the students go back and forth to the liberal arts school or whether he is going to have that instruction given in his own

institution. Then again, how would he assign the hours to be spent in the school of liberal arts; for instance, if the students select individual or special subjects, could he arrange with the liberal arts school to so change their hours that the dental students could secure the desired instruction in the particular hours or half days they desire to devote to those subjects.

In regard to the lecture and recitation system, I would ask how Dr. Black will overcome the difficulty of finding text-books which will cover all the ground in a particular subject so that they can be used to the exclusion of lectures. Personally, I hardly think that is possible, I believe we must resort to both methods in order to cover the ground.

The chief excuse for lecturing is that the professor or instructor has the time to read all the latest text-books and magazines pertaining to a subject and is able to present an epitome of these to the student. If we are going to rely on text-book instruction alone, the student would have too many text-books and would not have sufficient time to study them.

Those are, I believe, important points in connection with this paper, and I would be very much obliged if Dr. Black would tell us how he is going to take care of them.

Dr. B. Holly Smith, Baltimore

I do not know what form of incubator Dr. Black has in his mind when he speaks of a man who is made to think. The think nodule is a common thing among our species, and we sometimes use it. But as a matter of fact it very often occurs that we have material that reaches us through the ordinary avenues of education where thought seems to be absent. I do not think that preliminary education means that a man is trained to certain things. For instance, Dr. Vaughan said that if we had all our students take a course in college physics, biology and chemistry, they would have a better understanding of some of the procedures of the course and could go in with advantage. My idea of college training is not that a man has acquired so much of Latin or Mathematics or History, or Grammar even, but that in the active pursuit of knowledge he has acquired the habit of thought and that he comes to us better prepared in that sense. I am not disposed to think that we as a professional organization, or our schools as professional schools training men for a profession, should depend, upon any split course. Our men come to us with only this habit of

thought and with this preparation and four years is not too much to spend in the training of a dentist; not the training of a man in literary pursuits, not the training of a man in any pursuit leading up to dentistry, but the absolute training of the dentist. Oh, I am impressed with the idea that we have opportunity, with a curriculum so widely extended, for much collateral training. Take Radiography and Metallurgy and Chemistry, and specializing with Dr. Price in his work of research, all this opens a wide field of usefulness which might be entered by us in our work among our students.

Now, I cannot understand what Dr. Black meant when he said that teaching in sections would disintegrate the class. It has been the habit of the Baltimore College of Dental Surgery to divide its students into sections of eight, which sections meet from time to time and have their section organization.

I have found this plan most useful in calling two sections together for a quiz. For instance, in training we find the section an advantage in that through the co-operation of its membership, the poorer students are helped and the general level raised. I would like Dr. Black to answer the question, why would that section work, carried on with any number of students, disintegrate a class, or why would there be less class spirit? On the other hand, why would there not be some rivalry to out do the other sections?

Of all the splendid things I have heard since coming here tending to make me somewhat ashamed of myself for the weak effort that I have put forth in the teaching of Dentistry, this paper by Dr. Black stands first. I feel like going home and saying that I shall do nothing else but teach Dentistry, morning, noon and night.

I would take this opportunity to apologize to the Institute by saying that I did not know I was to be asked to answer to the delightful address of welcome by the President of the University, until I came down stairs this morning. I did receive the program in due order, but said to myself, "Smith, put it in the bag, put it in the bag," and so I did not know anything about it. As you know, levity is my long suit, and so I apologize for the levity used. I should have made a more serious response to the very dignified address of the President.

Dr. Hillyer: Do you mean, Dr. Smith, that those sections were quizzing among themselves?

Dr. Smith: Certainly.

Dr. Hillyer: Just simply among themselves, without any quiz-master?

Dr. Smith: Yes. However, I frequently quiz them myself calling several sections together for this purpose. And our technic work is also done in that way.

Dr. Ellison Hillyer, Brooklyn

It would hardly seem feasible, nor do I believe it is Dr. Black's intention, to divorce entirely the lecture work from the recitation work; experience has been that the student may sometimes study a thing, apparently to his own satisfaction; he may listen to a lecture on the subject and when you come to quiz him you find that his conception of it has been an erroneous one. I think that the proposition of Dr. Black is most admirable. It is practically a new one, and one so radical as to make it almost impossible for some of us. But if we had nothing to look forward to we would have little in the way of inspiration and I certainly hope that we may be able to carry out some portion of this in the future.

Dr. T. W. Brophy, Chicago

To quiet the disturbed mind of Dr. Smith, I announce that following the passage of the President out into the other part of the house, he informed me that the response to the address of welcome was the most satisfactory and the most beautiful that he had ever heard.

When I saw the title of Dr. Black's paper my interest in this meeting was at once aroused, and largely due to this fact I managed to get here. There is something very alluring about it. Unfortunately, however, the committee on original research work drew me into their meeting at the hotel and held me until I came too late to hear the paper. But from the remarks that have been made in the discussion I have gathered something of its declarations; not all, but enough to give me a cue to the situation.

What most concerns teachers in dental colleges of this country today is not what we are going to do with the student after he comes in, but how to determine whether he is qualified to come in. This is a question that interests every man that is engaged in teaching dental students. It has been demonstrated that the standard fixed for entrance to our schools

—graduation from an accredited high school—is not satisfactory. Graduation from an accredited high school means but very little, because a graduate from such school is not always a man of good education.

My friend Dr. Koch told me not long since that in the Northwestern University Dental School they make an award to men who pass, as I remember, over 95 per cent. in all their studies. In that great institution they have graduates of universities, of high schools, of parochial schools, of private schools, and of normal schools, and many who are not graduates of any school. Those who are not graduates of a high school must go before the State Superintendent of Instruction to be examined. And of the twelve individuals who won the award, six were men who had passed the examination of the State Superintendent of Instruction. And further than this, some of those who were graduates of universities and graduates of the various other schools, failed. Now, I am satisfied, and I say this advisedly, that in the dental schools of this country are many students graduated from an accredited high school, who, had they gone up before that honest old man who examines men in Illinois, Mr. Downing, without his knowing anything about them, would have been rejected and sent home. And it is a misfortune that the schools are compelled to take graduates of high schools without subjecting them to an examination.

The dental institutions of this country must change their methods. They must demand that applicants for admission shall have such education as enables them to *know* the subjects they have studied. There are high schools and high schools. And, as I remarked yesterday, in the last few months we have received a terrible jar on the question of high school education. We know that the high school is not the proper place to prepare men for professional study. I wish I had been here when the paper was read, for I presume Dr. Black has told us how to do it and how to get over this difficulty.

And so with regard to text-books and quizzes, and professors and lectures, I would go on record as saying that the average high school graduate is not fitted for entrance to professional study.

It has been well said that we must devise some plan to get the student to think. Well, judgment can not be taught,

judgment is something within. It is a part of an individual. We may teach and teach and yet we can not always instill into the individual the faculty of judging. Some can, others can not.

Then how shall we teach? In my opinion the best way to teach is by teaching, just the way we were taught when we first went to school. Let the student learn the lesson from the book, let him be quizzed by some one competent to quiz him, and then let the professor come before the class and bind and cement and draw together all of the principles involved in the consideration of the subject. And in my opinion, when he does that he will have reached the very highest point possible to reach in furnishing information to that student and fixing it in his mind. One of the best addresses I ever heard on the subject of teaching was by a man who put forth the principles that I have given you. The book is the place for the student to get his first information, the quiz is to see if he knows it, when those things which are not understood by him are made clear, and then the professor comes before him and presents all the different phases of the subject and makes the matter as plain as it is possible to make it. I think that this is the principle that should guide us. If we can reach such a conclusion in our educational work, we shall be able to bring our students up to a higher standard.

Reference has been made to quiz work among students. A group of students who did the very best work that I believe was ever done in the college with which I am connected, was made up of young men who quizzed one another from the beginning of their college career to the close. They resolved to get together regularly and question one another regarding the work that was done. When they did not agree, the principles involved were brought to the faculty for elucidation. And the very fact that they did not agree was a means of educating them, for they remembered these points when once informed upon them much better than those upon which they were agreed. Some of the best men we ever graduated were those who quizzed one another from the beginning of school work to the end. I would, therefore, encourage students to get together in groups and quiz one another, and then if they do not agree upon some points to bring the matter to the attention of the professor teaching that particular branch and let him clear it up. This method will assist materially in reaching conclusions that are correct.

Dr. A. E. Webster, Toronto

I want to present for your consideration a plan which we have followed in our school for some three or four years. To begin with, in presenting the subjects of Operative Dentistry and Dental Pathology, at the beginning of the session, I lay out books to be read outside of the regular text-books, varying them from year to year as time goes on.

The students are asked to read the following:

D. D. Smith, papers on "Prophylaxis."

"Oral Hygiene" (published about two years ago), Marshall.

"Oral Sepsis," Hunter.

"Cause and prevention of dental caries," Sim Wallace.

Also a work not very much read, "The Causes of Irregularities of the Teeth," a book of about 60 pages.

Johnson's "Success in Practice."

Adami, "Inflammation."

Black, "Peridental Membrane," and perhaps also "Poisons Developed in the System." By the same author.

Price on "Inlays."

McWhinney, "Experiments with Drugs."

About the first of February, I lay out the essays which they are to write upon, possibly a dozen of them, reading the titles to the students. About the 10th of March I divide the class into sections and then two or three essays are named for each section. The student knows what the subjects are and may choose one of three of these.

He must write an essay of not less than 3,000 words. When the essays are presented the ones that I think are worthy are exchanged among the students themselves, while those essays that are not worthy are banished. At the close of the session I set an examination on those essays that I have deemed worthy, and that constitutes the term work.

Dr. H. R. Raper, Indianapolis

I want to say something; rather, I believe something should be said. Personally, I do not want to say it at all, and I have been sitting here hoping someone else would say it. Dr. Thornton argues like a mad woman. He says he does not like it when somebody else assumes the "holier than thou" attitude, then he immediately follows this with, "We are the peers of those in any profession." We are no such

thing, and it was very discourteous to say this when Dr. Vaughan, of the medical profession, has come here and said the things he did in the kindly way he said them. Therefore, I want to say, believing I voice the opinion of most dentists, that I realize we are not the peers of all the professions on the face of the earth. Dentistry is no better and no worse than any other profession.

Dr. Black,
(Closing the Discussion)

I am not going to detain you long in the closing of this discussion.

My first thought is that I have been repaid for presenting this paper, and you have been repaid for hearing it by having brought out the discussion of Dr. Vaughan. We must recognize in Dr. Vaughan (I am sorry I could not have said this while he was here) one of the leading men of the world, not only in medical education, but in educational matters generally; and while I was naturally pleased to have his views agree with some of those which I had presented, I was not much less pleased to have some of his views opposite to those which I had presented, because they will have material weight in guiding our thought on some of the points which he mentioned.

A year ago Dr. Bowles asked me to read a paper at this meeting on the subject of study; that has been the main idea which has been in my mind during the past year. in my observation of the men in our school and in other schools, and of the men in practice, as to what element there is in the dental student which has inclined him away from study or which has never inclined him to it.

I have not tried to present a paper which expresses my ideal of the way dentistry should be taught, but one which represents my idea of the best teaching that we can give to dental students, for the next few years at least, on the basis of the conditions which pertain to-day, both in the man who comes to the dental school, and the man who is in practice. The time ought to come before a great many years when methods different from those suggested today will be the best to use, because if as a result of this or any other plan, we can in a few years attract to the dental school a different type of men from those that we are attracting today, then necessarily the methods which are presented here today would not fit that type of men as they do the type of men we are getting as students today.

It has been suggested by Dr. Vaughan, and this has been the burden of my paper, that most men are lazy and will not do very much, particularly in college, that they are not required to do. Therefore in the preparation of this paper I have aimed to present a plan which would require a man to study, and which would *make* him think. Dr. Holly Smith maintains that we can not make a man think. We can not make some men think enough. I have suggested what would happen to those men who do not think if this plan were adopted; they would drop out by the process of elimination if this method were adopted, and we would eliminate many men who really ought not to be graduated.

It has been requested that I should say something of the plan of meeting some of the difficulties which present in the establishment of the suggestions contained in the paper. The action that might be taken along the lines suggested would necessarily be somewhat different for every institution in the country. That must be adjusted to the conditions which present in the individual school.

In any particular institution, the details in the establishment of the essentials of the split course would depend largely upon the relationship of that dental school to the other departments of the university, if a university school; or the relationship which might be established between it and a college, if it were not for such a department. Also the matter of location would be of material consideration, because in some cases the dental department of a university is located a hundred or more miles from the university itself. However, it seems to me that there would be no great difficulty for any institution to meet the conditions which present in that respect. As an example in our own state, take the University of Illinois: The University proper is located in the central part of the state, while the dental school is in Chicago. I see no reason why a year's course should not be given by that University at Champaign which would include a dental subject, and the other three years in the dental school in Chicago. I think the split plan in that school would be better than the regular freshman year in the University, and then three years in the dental school.

In the case of a school not connected with a University I think there would be little difficulty in making an arrangement with a college to give the instruction which could not be given

in the dental school. It is a matter of adjustment for the particular institution. I really think our own school is in about as much difficulty as would be any, because we are so near our College of Liberal Arts, 13 miles, and yet so far away that it will be rather inconvenient for our students to go back and forth every day. It has been our thought that our students should go to the University four mornings a week during the first two years. When it comes down to closer adjustment of these matters this may be changed somewhat but that is our present plan.

Dr. Starr brought up the matter of text-books, and Dr. Hillyer asked if it was suggested that we should make an absolute change from one plan to the other. I think we should not make an absolute change. Purposely, I possibly over-emphasized a little the recitation plan because I wanted to impress it. But you may recall that I suggested that we should adopt plans in each department, which best fitted that department. I would say that the dean of each school should consult with the head of each department, determining in the first place, if there is available a text-book which fits the teaching of the department, then would come the question of finding capable assistants to cooperate with the professor in the recitations. The only other question is the physical arrangement of the school to handle the classes in sections. It is not necessary that a school should jump from one plan to the other absolutely. It may be tried first in those courses in which they are best fitted to try it, and if the teaching is bettered, it may be extended to include others. Recitation rooms which will accommodate the sections of classes would of course have to be provided. If you will pardon me for referring again to our own institution, I will say we are planning the remodelling of one floor, making our laboratories half their present size, but to be in use twice as many hours as under our present schedule. This will give us space to be converted into recitation rooms. We shall have eight of these recitation rooms near the library and reading room. I have thought that if we could arrange a half hour in between recitations the men would, with these recitation rooms close to the reading room, occupy the time for study in preparation for the next recitation. There are many little things of this kind which can be worked out, some of which will fit in one institution and some of which will fit better in another. Several suggestions were made by other men as to plans for inducing men to study.

which are all good, and I am not going to take your time to go into them.

Dr. Vaughan emphasized the idea of theses. I believe that in many dental schools certain chairs have for a good many years been in the habit of requiring at least short theses. I am inclined to think that we could extend this plan to advantage. If the professors, in several of the departments at least, would do what Dr. Webster has suggested, announce at the beginning of the year that they will require a thesis on a certain subject, this would compel men to do a little of the particular kind of study that is most important to a man after he gets out in practice.

Just one word in regard to the relationship between recitation course and lecture courses. I see no reason that there should not be the widest variation in this, depending upon the ability of the lecturers, the character of the text-books used, etc. The extraordinary ability of certain men to give instruction by lecture must be taken into consideration. But I think if each of us will try to analyze our respective abilities and qualifications as lecturers, many of us will possibly come to the conclusion that we give anywhere from one-half dozen to a dozen real good lectures during a course, and that many of the others are not nearly so good; we can tell the difference from the fact that the students do not pay as close attention to us in those other lectures. Perhaps this is because we have not prepared ourselves as well as we should, and again there are subjects which are not as well adapted to lecture as to recitation. If the head of these departments will study his course with the idea of selecting those things which will be most interesting to lecture upon, and lecture upon those—the most important things in his course, and then will lay out recitations for his class which cover all the rest of the work, the adjustment of all this to be in a different way probably for each course in the school, I believe we will get results not only in teaching but in inducing more study, and above all things that is what we need.

REPORT OF COMMISSION ON PROSTHETIC TECHNIC

In preparing the report of this Commission for the meeting a year ago, an effort was made to ascertain what was required of each student in the Department of Prosthetic Technic in the different schools. That effort was a partial failure on account of the small number of replies received (17 out of 43).

In the discussion of the report last year, Dr. Guilford suggested that the Commission should prepare a list giving the minimum number of cases to be required of each student and submit this list to the different schools for criticism. Neither your Commission nor the Executive Board considered this at all feasible, but your Commission has taken a hint from the suggestion and will endeavor to present a minimum of principles which should be incorporated in cases required rather than attempting to standardize a course by specifying the work in detail, as each teacher would prefer the student to apply a certain principle in a different variety of cases. It was deemed unwise to submit this to the schools in so crude a form as is only possible at this time. Probably after a thorough discussion this report might be amended, printed and sent to the schools next fall, when some valuable suggestions would be received for next year's report. It might be possible to have an exhibit made up of the minimum number of cases necessary to exemplify these principles.

It was quite apparent even from the few replies last year that there was a lamentable lack of training in this branch in some of the schools and possibly by suggesting the principles in which the students should have technic experience, the courses may be materially improved.

It is not intended that each principle should require a separate case. Several might be incorporated in one piece, but each succeeding piece should involve a principle not already presented in order to create interest in that piece. However, each principle, somewhat varied, should be repeated a number of times so that the student may become somewhat proficient in it.

Why is it that a large majority of students look upon Prosthetic Dentistry as drudgery? Mainly, doubtless, on account of the monotony and labor involved in filing, sand papering and finishing. In order to overcome this tendency to, on

that account, develop a dislike for this important branch of Dentistry, it is suggested that the student be required to finish a *very* limited number of cases and hand in the remainder when waxed up or even ready to pack . This would also give the class more time to undertake additional work.

It is not intended however to suggest the order nor the year in which these principles shall be taken up, as what would appeal to one teacher as correct would be far from the ideal of another.

1. Impressions in Compound, full and partial.

2. Impressions in plaster, full and partial.

3. Impressions in Compound and plaster.

4. Pouring and separating impressions. Trim models for Orthodontia Department.

5. Adapting base plates to full and partial cases.

6. Waxing—touch as little of natural tooth as possible.

7. Flasking, different methods for full and partial.

8. Vulcanizing (spring only), (on Spence's Compound or similar substance) and finishing.

9. Repair
   (a) Cold packed.
   (b) Waxed and flasked.
   (c) Replace gum section.
   (d) Replace broken tooth removed with flame.
   (e) Grind tooth to fit pink gum.
   (f) Fusible metal repair.

10. Partial Vulcanite upper cases involving:
   (a) Clasps and supports.
   (b) Gum block.
   (c) Tooth ground to replace recent extraction.
   (d) Tooth ground to replace remote extraction.
   (e) Replacement for absorbed alveolar tissue.
   (f) Bar skeletons.

11. Partial Vulcanite lower cases involving:
   (a) Bar, (bending bar in two directions).
   (b) Clasps.

12. Temporary Denture.

13. Clasps, (a) Attached to Vulcanite base.
(b) Attached to metal base.
(c) Attached to bar in lower partials.

In every case a spur soldered to clasp and inserted in or soldered to base.

14. Tin foil matrix.

15. Cast work,
(a) Partial cases.
(b) Full cases, indirect method, reswaged.
(c) Saddles.
(d) Finishing.

16. Moulding for zinc and lead—Hawe's flash and core.

17. Casts and Dies:
(a) Full cases.
(b) Partial cases.

18. Swaged:
(a) Partial.
(b) Full.
(c) Attachment of Vulcanite (1) Wire spurs; (2) Loops punched; (3) Triangular wire rim.
(d) Finishing.

19. Compensating exercise for hard area.

20. Full case articulated to natural teeth, anatomically (Snow system).

21. Full upper and lower cases anatomically arranged, Snow system.
(a) Flat condyle path.
(b) Marked condyle path.

22. Gum sections:
(a) Single gum block.
(b) Full case.

23. Bites for full and partial cases.

24. Special attachments and supports, Gilmour, Roach, studsrests, cribs, &c.

25. Splints with face bow.

26. Obturators,
    (a) Full and partial with attachments.
    (b) Solid and hinged (spring and elastic).
    (c) Soft and hard.

27. Continuous gum.

28. Special impression tray for special cases.

29. Artistic grinding of teeth for age and pyorrhea.

30. Grinding and staining teeth to match natural teeth.

31. Removable facings and crowns and natural teeth on vulcanite and metal bases.

In all cases have the base touch as few of and as little of the surface of the remaining natural teeth as possible. Every case should articulate with opposing teeth.

Any student who had several times applied all of the above principles in technic work should be fairly well equipped to satisfactorily serve the public.

This may seem like a pretty large order, but for a moment consider what the teachers in Operative Technic give their students. Does not their course aim to have the student perform on a dummy, all the operations which he will later be called upon to undertake for patients? Why not the same in Prosthetic? Surely it is not of less importance.

Consider again another feature. How much of the operative restoration necessary today is the result of faulty prosthetic restoration? Should we not give our students as much instruction and technic experience as possible in order to enable them to construct such prosthetic appliances as will minimize, if not eliminate this danger to the remaining natural teeth? A number of the above principles will accomplish this.

W. E. Willmott, Chairman

DISCUSSION.

Dr. Ellison Hillyer, Brooklyn

This report was handed to me last night. I read it as carefully as I could, and fully intended to be present at the time of Dr. Willmott's reading of it in order to get the full impression as he presented it. I regret that a committee meeting has detained me until this very moment and I could

not arrive in time. Consequently I feel hardly in the spirit of discussing the report.

There is no question but each one of us, interested in the teaching of Prosthetic Dentistry desires to see this department at its very best. I care not in what manner it may be brought about, or how fast it may go; in other words, let the limit be as far as it seems wise to carry it and I believe every one of us will be willing to go that limit.

Dr. Willmott spoke about the aversion on the part of certain students and graduates to taking up prosthetic work, on account of the labor involved in the finishing of the vulcanite. Granting there may be something in that. I really do not think that is a phase we need to take into consideration in regard to the student. If it is a question of saving time, that perhaps might be a small item, but I do not believe it is so large as to warrant our making a very great point of it.

I should prefer to have them carry this work on to the fullest completion, because it is my impression that they do not get any too much of the vulcanizing and finishing. Therefore I would prefer not to stop at the waxing portion.

So far as the steps to be followed are concerned, I hardly think that there is anything in this whole list of 31 items to which we could take exception. I am heartily in accord with it, simply adding that, given added time, we will do this and more.

Dr. S. H. Guilford, Philadelphia

I shall not take up much time, simply because the report does not require very much discussion. It evidences a great deal of thought on the part of the writer, and he has gone into the matter very carefully indeed. I would say that if, in his practice, Dr. Willmott gives his patients as much for their money as he gives his students for their money, he is a very liberal man, because the amount of work laid out here for the student in a technic course is to my mind simply amazing. In our college we give the prosthetic technic course at the same time we give the operative technic course; in a different room, of course, but they are going along simultaneously, and the students have their hands full in doing about half as much work as is indicated in this report. We try to cover all the essential points, but it is not nearly as complete as is the course outlined by Dr. Willmott, and I might say that if it were

we would not get through with it. But we do try to make it as perfect as possible, having each operation the students perform done over and over until they acquire the facility and skill which will serve to prepare them for the practical work coming later. We do not give them anything in the way of work in the prosthetic technic course, because it is very elaborate and difficult work at best but we try to give them all the ordinary work that would come to them in practice, and in doing this we feel we are doing as well as we can do.

The suggestions of Dr. Willmott as laid down in the paper are good, and I think we will be willing to accept them, not as to quantity perhaps, but as to quality.

Dr. Abram Hoffman, Buffalo

I have been somewhat at loss as to how to undertake the discussion of this report and hoped the remarks of the gentlemen preceding me would help me out.

First of all I would compliment and commend the single-handed effort of Dr. Willmott. It is unfortunate that he has received so little co-operation in a body of this nature. The situation leads to the question,—"are the teachers of this subject entirely satisfied with their ability to teach it" or "is the subject now taught well enough" or "is the subject not of sufficient importance to merit consideration at the request of the chairman of a commission?" I will not undertake to answer the first two questions other than that there seems to be a growing lack of interest in this department of dental teaching. As to the third question,—it is important, or the president's address would not report one school trying to give 2200 or 2300 hours to it in a three years' course,—to say nothing of the numerous recent advances in prosthetics. Somehow the conditions do not seem to be consistent.

After reviewing the report I thought we might possibly enter into a discussion of it on the ground that the program calls for a "minimum schedule" and our chairman has given us a "minimum of principles."

If we were to undertake the discussion of the list of principles as laid down and they are well suited to the average dental course, we could discuss for hours. Would it not have been better to submit for discussion a minimum schedule of the pieces as such, including the number and nature of them, leav-

ing the principles involved in their construction to be worked out and laid down for us as a later work for this commission?

At Buffalo we still take wax impressions. Not especially because of the principles involved in the impression but to give the student a better understanding of the properties of the material itself. This material is too frequently misused, not only by the student but by the practitioner as well.

Personally, I rather question the advisability of including in the technic work a bar skeleton plate as enumerated under No. 10, if I interpret the meaning or piece correctly. A denture of this nature, as well as obturators, continuous gum work and the like, should be taught in a lecture or demonstration and not at the expense of a lot of time in the technic course. Would it not be more advisable to leave all this special technical detail for the man who is particularly interested, fitted or gifted, to work out in practice the same as in many other specialties of dentistry or medicine?

In our school we, naturally, are heartily in accord with the methods and appliances of Dr. Geo. B. Snow and I assume this to be the case with most of us here assembled.

The use of tin foil as a matrix and tin in its other forms is a valuable addition to any technic course and should be taught universally.

As to the compensating exercise for the hard and soft areas, —I think this subject should first be treated in the lecture room along with the principles of retention, relief areas, vacuum chambers, etc., and then the student should be clinically drilled, at the chair, in seeking these areas in the mouth, and carefully noting them on a paper. We have in the exhibit room a specimen chart such as is used by our students in noting all conditions of interest to the best of his ability. Later, the demonstrator examines the mouth and chart and gives a grading upon these observations. It has proven a very satisfactory method of stimulating a closer investigation of the oral conditions.

It does not seem advisable to eliminate the "finishing operation." If a laboratory is properly equipped the drudgery of finishing and polishing a plate is reduced to a minimum. If a student is required to polish a plate carefully he will be interested in seeing it develop in his hands. It will stimulate him to a keener perception of surface form and should develop his ar-

tistic sense. If the plate is not properly finished it is sure to leave the impression that the operation is unimportant or unnecessary and we now have enough plates finished under those conditions.

Dr. N. S. Hoff, Ann Arbor

As a member of this commission I want to apologize for not giving Dr. Willmott my help in the preparation of this report. Because of personal incapacity, I was not able to give the co-operation I fully intended, and should have given had I been physically able.

The curriculum as here outlined for a prosthetic technic course is sufficiently comprehensive for all our purposes. I suspect none of us will feel that any important thing has been left out. On two other occasions we have had presented to us syllabi for this course. I do not believe that we can as profitably discuss the method of instruction:—That is, what should be done, and why should we do it. It seems to me that every teacher of this subject will have his own idea of what should be taught, every teacher will also have his own idea as to why he teaches a thing, and will adopt his own method because he will have his own objective in mind. If we could have a discussion of the various methods of giving this instruction, this would probably be more profitable than to try to develop syllabi of subjects to be taught. The discussion so far indicates this very clearly. It seems to me that, as we all have our own ideas as to what ought to be taught, we should be inclined to change the syllabi to meet our own views.

The conditions under which we work will always modify our method of teaching. The personality of the teacher has much to do with his success. Every teacher has his own method which may finally come to be more or less of a hobby with him, and then he will perhaps confine himself to his hobby, to the detriment of an efficient presentation of his subject. For instance, take the method mentioned here to-night of taking impressions. Dr. Willmott does not believe in wax impressions at all, Dr. Hoffman does. To me wax is one of the most valuable impression material we have. I do not desire to discuss this point however, but simply use it as an illustration. I believe in it cordially, and perhaps I emphasize it too much in my teaching. Others lay emphasis upon some particular thing they are doing. Now, if we could get the prosthetic teachers together, and each

of us would present his own method in detail, and explain why we give such a method particular emphasis in our institution, possibly we should see matters more clearly and we would be inclined to get together on a more uniform method of department instruction. We should then know why we were giving such instruction and we would develop the underlying principles which we should keep in mind all the time in giving instruction.

If you will visit our Freshman laboratory, you will see how we are giving instructions. You will see the result in the technic museum, and perhaps you will think that we are undertaking too much work in this course. That is simply because we have a definite object in mind in doing this. We perhaps do more pieces of work than we can do and do them as we should like to have them done, because of lack of time. It may be debatable whether we should not do fewer pieces of work and devote more energy to developing the principles upon which the work is done. We also are trying to develop in the individual his constructive capacity. In other words we try to give the student the principles involved, and at the same time to teach him manipulative methods. Whatever the character of the pieces to be constructed, the fundamental idea of instruction in the fundamental principles is a question we might discuss more profitably than to simply catalog the pieces of work we may do. And as I do not see how we could do this satisfactorily in the short time we have at our disposal in this meeting, is it not a matter that should be further worked out by a commission of experts? If each one of the teachers of this subject in the Institute would develop in his own way his own methods and then tell us why he is emphasizing any particular phase of the work, we would get somewhere on this subject.

Dr. Willmott,
(Closing the Discussion)

I realize as well as any one that the course outlined here constitutes a pretty large program. The President this morning presented you with what he called a very fat book on prosthetic dentistry, and one school occupies 2289 hours in this work. It struck me at the time that when a student had finished his course there, he would not be very fat. But that school could certainly undertake this outline and two or three more like it; but it was not built for that school.

We accomplish practically everything in that outline. You tell us, although we have four sessions, that we have no more actual teaching hours than you have in three sessions. So I put it up to your own argument: If we can do it, why can't you?

I might say that a copy of this report was mailed to Dr. Hillyer a week ago to-day, so it is not my fault that he only received it last night when I gave him another copy.

As to the question of drudgery. I think that our students are not different from students found in other parts of the country, nor are our practitioners very different from practitioners on this side of the line; and I still maintain that prosthetic dentistry is looked upon as a drudgery. Why should so much of it be sent to the laboratory man, if it is not? And that drudgery is due to the monotony of the finishing of the case. Now, I do not ask, nor in the report is it suggested, that all cases should not be finished. In last year's report you will remember we had all the way from seven to twenty cases in the different schools. Take the average of ten or twelve cases: Surely if a student finishes five or six of these, and he has had the interest of watching these cases develop, he should be excused from watching any more, and spend the time at something more important. In some schools are foot-lathes, which add to the drudgery.

Dr. Guilford thinks this is a pretty big contract because it could not be taken up at the same time operative work is taken up. We take it up at the same time. For instance, our junior class has operative dentistry all the morning and have this work all the afternoon. Before Christmas they have it all the morning. By distributing it over the three years, or, as it will be, over the four years, it could very easily be accomplished.

Dr. Guilford also stated that in their course they covered all ordinary prosthetic work a man would be called upon to do in practice. That is just the point I wish to emphasize. We have too much ordinary prosthetic dentistry. If you don't believe this, go and look at the exhibit and see. The last paragraph of the report calls attention to the fact that a great deal of the operative work that is necessary now is the result of faulty prosthetic work. And if you will go and look at the exhibit you will find case after case in replacing one, two, three, or four teeth, where every other tooth in that arch is touched by

the appliance. Eventually every tooth will require some operative procedure. If that case were modified by up-to-date methods, this would obviate the loss of the natural teeth to a very great extent. And that is why among the principles enumerated in the report, those pertaining to keeping the appliance away from the natural teeth are so often mentioned.

As to bar skeletons. The idea is to remove as far as possible all vulcanite from the mouth and leave the tongue as free as possible to touch the mucous membrane. If a student has had no technic experience on this point, no matter how many lectures you give him, he is not going to attempt it on a patient. But if he had had one or two typical cases in the laboratory, in almost every partial case with which he is confronted in his practice, he could apply some of the principles which he had applied in his technic and would be of very much more service to his patient.

Regarding wax impressions, until a year ago I thought that was dead. But after the meeting at Buffalo I received a letter from Dr. Hoff criticizing the report (to which his name was appended without his knowledge) on that point.

Dr. Hoffman states that many practitioners are slovenly in making beeswax impressions. I do not blame them, and I think they ought to be. Now, if you object to the practitioner being sloppy, why do you put out more practitioners every year who are likewise going to be sloppy? If you discard the wax then you will not have any sloppy wax impressions later on.

Exercises for compensation of the hard area, referred to by Dr. Hoffman. The idea is to have the student take an impression of the mouth, produce his model and have it present at the chair, and then instruct him in ascertaining the hard and soft areas in the mouth and have him mark them on the model.

Dr. Hoff suggested that some might criticize his work here because he was undertaking too much. I think that would be a compliment to the course. Personally I believe we can not give our students too much prosthetic technic. The more we give them of the proper kind the less operative procedure they will have to perform later on.

The whole idea of this outline was to bring before you the necessity for revising our technic courses. And, as I have said, if you will look at the exhibit you will see the necessity. In

every case wherever it is possible to relieve the natural tooth from the presence of any foreign material, we should do so. In some of the lower bar plates in the exhibit you will notice that the clasp comes around from the mesio-buccal aspect of the tooth, around the buccal surface, across the distal and around on the lingual. The vulcanite continues around the lingual surface of that bicuspid, possibly up to the second tooth from the space.

If that clasp were to grasp that bicuspid on the buccal, lingual and distal surfaces and a spur were soldered to it, running it back into the vulcanite, and not allowing the appliance to touch the natural tooth at all, the tooth would last longer. And that is what we should teach our students right along.

I thank the members for their compliments, and take this occasion to acknowledge the assistance received from the man I look upon as the leading prosthodontist of this Institute, Dr. Cummer, of the school with which I am connected.

REPORT OF THE COMMISSION ON NOMENCLATURE.

Dentistry needs a language of its own. It needs to have that language authorized and recorded by this body. A comprehensive dental glossary is needed by the student, teacher and practitioner of dentistry. One nomenclature, and one only, should answer for American dentistry. A standardized dental curriculum is not possible without a standardized vocabulary. State Board Examinations will become more reasonable to the candidate for license when this is accomplished. It is hardly necessary, however, to assume the argumentative in stating such simple and obvious facts. To bring conviction to this body on the question of needs is a work of supererogation. The pertinent question is not why, but how.

Your Commission decided early in the year to ask the executive committee, the ad-interim body, for authority to enlarge its membership to include representative teachers in the various dental subjects. This authority was granted and the following gentlemen have been appointed:

1. CHEMISTRY & METALLURGY.
   Dr. M. L. Ward, *Chairman*
   Dr. W. H. Welker
   Dr. Alfred Owre.

2. HISTOLOGY & ORTHODONTIA.
Frederick B. Noyes, *Chairman*
L. M. Waugh
J. B. Stein
T. L. Grisamore
A. H. Ketcham

3. DENTAL ANATOMY, OPERATIVE TECHNICS & OPERATIVE DENTISTRY.
Dr. A. D. Black, *Chairman*
Dr. F. W. Gethro
Dr. H. E. Friesell
Dr. A. C. La Touche
Dr. Daniel H. Squire

4. DENTAL PATHOLOGY.
Dr. Russell W. Bunting, *Chairman*
Dr. Carl D. Lucas
Dr. E. D. Coolidge

5. MATERIA MEDICA & THERAPEUTICS.
Dr. E. D. Coolidge, *Chairman*
Dr. J. P. Buckley
Dr. Herman Prinz

6. CROWN & BRIDGE, PROSTHETIC DENTISTRY & CERAMICS.
Dr. Hart J. Goslee, *Chairman*
Dr. A. J. Bush
Dr. E. H. Hubbuck

7. ORAL SURGERY.
Dr. Virgil Loeb, *Chairman*
Dr. T. L. Gilmer
Dr. Chalmers J. Lyons

8. RADIOGRAPHY.
Dr. John F. Biddle, *Chairman*
Dr. F. L. Satterlee, Jr.
Dr. H. R. Raper

To give proper authority and direction to the task in hand, we beg leave to make the following recommendations:

1. That the Commission be authorized to compile a glossary of dental terms which shall be comprehensive and standard.

2. That a dental glossary be published in bound form either under the auspices of the American Institute of Dental Teach-

ers and placed on sale, or that the contract for publishing be awarded to a Publishing House on a royalty basis.

3. That a sum not to exceed $300 be appropriated to cover the necessary expenses of the work for the current year, to be paid on the authority of the Executive Committee.

Believing that these recommendations are sufficiently comprehensive and reasonable in themselves, they are submitted without further comment.

(Signed)

F. B. Moorehead, *Chairman*
S. H. Guilford
A. H. Hipple.

DISCUSSION.

Dr. R.W. Bunting, Ann Arbor

I received a letter some time ago asking me to be chairman of one of these subcommittees. I wrote Dr. Moorehead stating that I thought he made an excellent chairman, that he seemed to be setting out with the idea of getting some one else to do the work. But when I talked with him today and looked over the report just read, I saw that he intended to do a great deal of the work himself. But he needs help.

I would suggest just one change to be made in this report, and that is the item regarding the amount of money to be expended in carrying on the work. If this work is worth while doing it must be done well, and those members here who have given the matter any consideration can see that this commission has a big task ahead of it, a bigger one than it can do alone. Take, for instance, any one of these departments: It will be necessary that a great deal of clerical work be done in the way of looking up all the present terms in any particular department, that all these shall be gone over and revised and readjusted, and that each individual member of that committee shall go over the various definitions and make whatever changes may be necessary, after which all those must be rearranged before they can be sent into the general office for final correlation. And you may see that these individual committees will need a good deal of help along clerical lines. Personally I do not see how we can carry the work along in the colleges without having some clerical work, if it is to be carried on in the way in which we can see it might be done.

So the question to be decided at this time is, How much money can we put into this the first year? Can we spend $150, or more? Is it worth more? It seems to me that $500 should be the minimum, if available, for the work to be done on this during the first year, and the work carried on during the first year will be done for once and for all. I offer this merely as a suggestion. I have not the slightest idea how the finances of this organization stand or how much money may be on hand. But it is the only suggestion I have to make in the matter.

Dr. D. M. Gallie, Chicago

There is not much that I can add to what has already been said because I have not had time to give the subject much thought, having received copy of the report only a day or so ago.

The question of nomenclature is one that has been of interest to this organization as long as I have been a member of it. However, the matter of terms that are commonly used from one side of the country to the other and from border to border, has been up for discussion and the commission continued from year to year, that commission has come in with a report each year, but it would seem that but little progress has been made owing to the fact that the subject was of too great magnitude for a commission of three members to accomplish very much. In the report the suggestion is made that sub-committees be appointed to bring in reports, and this, I think, is the proper way to solve the problem.

It is, I am sure, apparent to every one that this is the body to take up the work to the end that we may have a standardized nomenclature. In attending dental meetings we hear men use terms from which those from other sections of the country will hardly be able to get a correct impression of the discussion. So that after years of attempting to bring about this reform, I think it is time we were getting down to something definite, and one of the ways to accomplish that is to divide the subject into different departments and bring it into court, when it may be put in such shape that we will have a standard nomenclature.

Dr. A. D. Black, Chicago

This is a pretty big proposition, and I can not see exactly how this Institute will be able to carry it out if it has to finance it. What I mean is this: If we are going to undertake the problem of compiling and publishing a dental

dictionary we are undertaking quite a large proposition, both in compiling and in publishing, which might get us into a very considerable expense. In this connection I am thinking of the troubles that the Dental Index Bureau has had, and I am questioning whether this association has any more right to put money into a proposition of this kind than it has in the Index Bureau, which it has not done. I do not in any way desire to oppose the idea of development of dental nomenclature, because it is one of the very important things to be done. But it does seem to me that the committee on Nomenclature and all of the sub-committees ought to be able to divide the preparatory work among them and do it at no great expense.

I do not believe that it is in Dr. Moorehead's mind although I haven't heard him say so, that it might be possible to complete this compilation in one year. It does not seem to me that it would be safe to pass this recommendation exactly as it has been made, because it authorizes the committee to complete the task assigned it. I am inclined to think that the recommendation should include the submission back to this organization of a report, or possibly of proof-sheets when that time shall have come, so that we may have opportunity for criticism.

I know of no single thing which an organization can undertake which is so difficult and which at the same time is so delicate in some ways, as the preparation of such a glossary. There are terms that have been in use in some sections of the country ever since there has been a dental school in those sections, and which have never been in use in other sections—all these things have to be taken into consideration, and this must be worked out by the committee in the best way possible. But it does seem to me that there should be provision for criticism, because after the glossary is once published criticism cannot improve it.

As to the first part of the report, I would be inclined to favor giving the executive board of this organization authority to exercise its own judgment as to what may be expended for this work during the coming year.

The matter of finances is, of course, something that will require a great deal of consideration. If this body in itself is not able to handle that part of the problem, it may be possible for us to secure aid from the Faculties' Association or from other dental associations, to the end that we may in a short time

be able to present to the dental profession a nomenclature that will be understandable to all. And therefore I think the suggestion of Dr. Moorehead to divide the work in the way he has outlined, is a good one. The question of finances is, of course, a very important matter in connection with the work of the commission, the same as in all undertakings. In this connection I have no suggestion to make that would in any way help the commission in solving the question as to how they will manage to finance it.

Dr. Fred W. Gethro, Chicago

Perhaps it would be in my province to speak of the finances of the association. I know that this organization has not the funds to put into anything, no matter how desirable that thing might be. I can speak very plainly because I know just about what our income and expenses are. Our income is about $1,000, and our expenses are about the same. We have $700 in the treasury at the present time, but our "Proceedings" have to be printed and other expenses paid.

Dr. Ellison Hillyer, Brooklyn

It seems to me that this matter is of sufficient importance to warrant an assessment upon the college membership. As chairman of the text-book commission, there have come to me during the year several communications regarding this very work. One communication came from a publisher who asked what I thought of the proposition of publishing a purely dental dictionary. At first I confess it did not seem as it the time were ripe for it, and I replied to the publisher that I did not think the time had come for such a venture because our commission on nomenclature was still at work and had not come to a definite conclusion. Then came a reply, stating that Dr. Moorehead had had some correspondence with this firm, and also in the same communication reference was made to the medical dictionary of Stedman as perhaps already covering the ground. I turned to the dictionary in question and endeavored to look up some of the ordinary dental terms that occurred to me and I could find almost none of the terms that we would expect to be defined. In other words we are entirely at sea, having practically no dictionary that gives purely dental terms.

The plan as outlined by Dr. Moorehead is an excellent one. The suggestion of Dr. Black to leave the matter in the hands of the executive board is also a good one, for I think that the board

is perfectly capable of handling the situation. If it is deemed wise by the Institute to make a small assessment upon the colleges, it seems to me that it would not be at all out of order. The publishers are ready to do the right thing and there is no reason the committee should not represent this organization. The royalty that would come from the sale of the book could come back into the treasury of the organization.

I ask the privilege of reading a letter from Dr. Ottolengui, received two days before I left home, and pertaining to the nomenclature report of last year. Knowing I was coming here Dr. Ottolengui requested me to present the communication to the Institute.

To The Members of the American Institute of Dental Teachers:
Gentlemen:

In the published transactions of your Buffalo meeting, I find the following in the report of your Committee on Nomenture; (Page 141-2)

"Another term introduced into our terminology by some writers within a few years is prosthodontia. This has evidently been fashioned from the term orthodontia, from which it has incorrectly taken the letters "th". If correctly constructed it should be "prosodontia" from 'pro' or 'pros' and 'odons' ".

Oddly enough the report continues as follows:

"We already have the terms 'prothesis' and 'prosthetics' from "pros," before or to, and "tithemi," "to place," and as they also appear in medical and surgical terminology, we think it is best to retain them."

As it happens that I personally coined the word "prosthodontia," I trust your committee will pardon my thinking that I know more than they do as to its etymology, and I respectfully beg to state that they were in error in reporting that the "th" was incorrectly borrowed from orthodontia.

The effort was to find a word analagous to orthodontia, I admit, but at the same time I wished to formulate it so that it would likewise be analagous with "prosthesis", but more specific.

Prosthodontia is a combination of "Pros", "to"; "tithemi", "to place" and "odons", "a tooth". The word therefore liter-

ally means to place a tooth to. So much for the correctness of its etymology.

In regard to "prosthesis" and "prosthetics", words recommended by your committee because they have a place in general surgery, I would respectfully submit that by a similar argument we might claim that in the phrase "dental surgery" the word "dental" is redundant, dental surgery being included in surgery. Prosthodontia was introduced to indicate "dental prosthetics".

May I refer you to the latest Standard dictionary for a few definitions.

Prosthetics, is "the practice of prothesis or substitution of artificial parts for missing ones in the human body".

A prosthetist, is "one who manufactures artificial limbs".

Prosthesis has two definitions. Its primary meaning is, "the addition of a letter or letters to a word".

Its medical meaning is, "the making of artificial parts and fitting them to the body, as false teeth, cork legs, etc."

Prothesis, the word mentioned in last year's report is not interchangeable, with prosthesis, but means "a pause equal to the length of two times or short syllables."

Perhaps I am prejudiced but it does seem to me that prosthodontia and prosthodontist, are preferable to prosthetics and prothetist.

I am aware of the fact that some would have us spell the word prosthodontics, as also orthodontics for orthodontia. As chairman of the committee on terminology for the American Society of Orthodontists may I request that you take no definite action in regards to "ics" versus "ia" as the final ending of these words, until you shall have had time to read the full report on this subject which will be presented at our next meeting.

Respectfully submitted,

R. OTTOLENGUI, Chairman,

Terminology Committee, American Society of Orthodontists

Dr. T. W. Brophy, Chicago

This question of nomenclature has been before the profession quite a long time, and, judging from what has occurred, I do not think that the gentlemen who are so deeply interested in it, realize that the International Federa-

tion, of which the National Association is a part, has a committee on nomenclature and that they have done an immense amount of work, all of which should be utilized in the making up of the report of our own association. Moreover in the National Association of Dental Faculties, Dr. Guilford, chairman of the committee on nomenclature, made a very elaborate report on the subjects of operative dentistry and prosthetic dentistry in two different years. That report was, of course, only suggestive and subject to revision, but it constitutes a very important part of the work that might be utilized by this commission.

Regarding finances, it seems to me that the suggestion made by Dr. Hillyer is a good one—that there will be money enough without being obliged to raise any here, because there are publishers who will be very glad to get that material and put it in a book and have exactly what is desired by the profession generally. I believe that, in making up this report, it should be the aim of the various committees to get in touch with the organization. Dr. Guilford is a member of this committee, and I know that Dr. Guilford worked with Dr. Llewellyn Barker, who has prepared a very valuable report on medical nomenclature.

To take up just one or two words simply by way of example: Many dentists think that to make use of the term *canine*, is a great breach of proper employment of a word, and suggest *cuspid* as a more refined and appropriate name for this particular tooth. And yet in general anatomy the word *canine* will be used perhaps to the end of time in connection with the fossa which bears that name. You could not induce an anatomist to make use of the expression, *cuspid fossa*. It will not be done. I am not advocating the use of the word *canine* to be applied to that tooth, but only pointing out how we should work in cooperation with the committees that have for many years been studying the question of nomenclature. They have worked out many things that are finished, and if the committees on these various subjects would look into these it would save them an immense amount of work—work as well and perhaps better done than the committees would do and terms that will stand in medical literature for many, many years to come.

In regard to the immediate expense, I am sure that when a man writes a book he just gets down to hard work and then

sticks to it until it is done, and it costs him money. When Dr. Guilford did this work, which was extensive, I don't believe he ever got anything for it. It seems to me the matter needs a great deal of patriotism, just the same as, when you attend this meeting, you have to pay your hotel bills and railroad fare. The man who is a member of this committee will have to make some sacrifices to do the work. And so I think the patriotism which leads us into this work should be the same as that which comes to us when we read a paper or attend a meeting, and other things we love to do in advancing the interests of our profession.

Dr. S. H. Guilford, Philadelphia

I had not intended to speak on this subject because I did not know anything of the report until it was sent to me this morning by the chairman of the commission. I had no communication concerning it, therefore did not know any more of it before hand than the rest of you.

You probably are aware that we have published two editions of this glossary. We have been working on it for a number of years, and there are several of these glossaries still in existence to serve as a basis for future work. More than that, this association appropriated money a year or two ago in order to have the work set up in line-o'-type. That is still in the care of the printer, but it is owned by this organization. Anything may be taken out of the old edition and new material put in. I think most members did not know that it would save a great deal of future work to use that as a foundation instead of laying it entirely aside and beginning all over again.

However, let us hope that by placing the task in new hands, we shall make more rapid progress than in the past.

Dr. A. H. Hipple, Omaha

I think we will recognize the desirability of doing this work, or of having it done for us. Possibly the commission could arrange with some publisher to finance the proposition. If we could do something of that kind it would be very desirabile, of course. A dental dictionary that would give us the nomenclature we want, and also some of the medical terms, would, I believe, find a ready sale among dental students. In our school we recommend to the students that they buy a small medical dictionary, a large one if they can afford it, and most of them invest in a pocket dictionary. But I believe

that they would be much more apt to buy a dental dictionary in order that they might have the definition of terms used every day in the class-room. Possibly it would be more profitable to the publisher to get up such a book than a medical dictionary with dental terms added.

Dr. A. W. Thornton, Montreal

Dr. Vaughan said this morning that the time had arrived when dentistry was a specialty in medicine. Dr. Black spoke of the time when the college course would be so extensive that, having taken a common course, men would specialize in some subject and that they then would be fitted for their specialty.

It just seems to me it is a question whether a dental dictionary should be published at all or not. We have many terms in common with medicine—the names of the drugs which we use, the names of systemic diseases, of pathological conditions. And if our association with medicine is becoming closer rather than more diverse, I think it would be well to look into the question of publishing a medical dictionary which would include all dental terms, because otherwise you could not at all reach unanimity as to the medical terms that should be included and those which should be excluded. But if a combined dental and medical dictionary could be published, it would, I believe, be acceptable to the medical men, who are taking a deep interest in these questions, and would be very suitable for the use of dentists also, and it would serve to draw the professions closer together rather than to increase the hiatus already existing between them. It seems to me it would be well to consider this point at the present time.

Dr. J. P. Buckley, Chicago

Before we can agree on the definition of terms, it will be necessary for us to agree on our orthography. As long as some men spell sulphate with an f and some with ph, and as long as some use the word pathologic and others call it pathological, as long as some of us insist on dropping the e from our alkaloids and certain negative parts of our salts like the chlorides, and other words, until Roosevelt has established his idea of the new orthography we will have difficulty in arriving at any conclusions with reference to the meanings of words. This letter from Dr. Ottolengui is only suggestive of the difficulty or trouble that we get into. And yet I do not want to be pessimistic in the matter of trying to agree upon the

meaning of terms. Some of us argue all night whether we should use the word resorption or absorption in connection with the disappearance of the roots of the deciduous teeth—I am sure Dr. Brophy would argue all night on the use of the term peridental membrane; and many of us object to the different names that are given to that common disease which Dr. Hoff says should be called peridentitis.

This is an important subject. It is something that should be encouraged, but it is a broad subject. And I think the first thing we ought to agree upon is how to spell these words before we try to define them.

Dr. C. R. E. Koch, Chicago

In this connection a thought has just come to me through the reading of a book on dentistry recently published in England and written by an authority named Bennett. Upon glancing through the book I found some nomenclature that was entirely new to me, with regard to dentistry. And so, with reference to the debate here, the question comes to me as to whether this is to be a purely American proposition, or a compilation of the dental nomenclature of the English language. For instance, that author speaks of the mandibular premolar and the maxillary premolar in describing the anatomy of the dental organs of the human species. Now, I have never heard the bicuspids designated by these terms, and in the work referred to are a number of other innovations from our standpoint. It has just occurred to me to suggest to the commission that they might make their report sufficiently comprehensive to include all dental terminology in the English language in order that the nomenclature may be universally employed by members of the profession speaking and writing that language.

Dr. Moorehead,
(Closing the Discussion)

The suggestion made by Dr. Hillyer and put into definite form by Dr. Thornton, has gone through the mind of the commission; that is, of making a text which would comprise a comprehensive nomenclature of dentistry as well as medicine. I wrote to two or three publishing houses and they were not inclined to take up that question. The firm which recently published Steadman's text declined to consider the proposition, but said they would be glad to take up the question of publishing a dental glossary which could be sold for

$2.00 a volume, giving to this organization the usual royalty of 10 per cent. The publishing houses with whom I have had correspondence are not particularly anxious to consider the question at all except the publication of a small text containing perhaps 5,000 or 6,000 terms, to be sold around $2.00 a volume. From the commercial viewpoint they thought that sort of thing might be undertaken. They have of course, no patriotism in the premises—nothing apart from the plain, unadulterated question of dollars and cents. It is purely and simply a business proposition with them, and unfortunately we have to take people as they are, not as we would like to have them. We can not change the convictions of commercial houses to suit our needs.

The matter of submitting a list of terms to this body for approval is, I think, absolutely hopeless. What good would be accomplished by reading a list of 5,000 or 6,000 terms? What would you do with them? Any review of that sort would have to be made by some authoritatively constituted body which could take the time to go over the list thoughtfully and carefully and act for you as your representatives. And you will be obliged, before the thing is ever done, to place in the hands of some group of men that authority, because the time will never come in the course of the development of human nature when a bunch of fellows like we have here to-night will ever get together on such small matters. Large things you can get together on more easily, but when it comes to the little things, then you become effeminate. The most that might be done when this thing is ready for publication, is to mail the list to the colleges.

Dr. Black: As this is a criticism of my suggestion, which the essayist evidently did not understand at all, I wish to say another word. I did not suggest that the report should be submitted to this body for approval but that it should be submitted for criticism—that is the word I used,—giving each member an opportunity to criticize anything he might wish, after which this commission could consider such criticisms and then finally adopt their report without consulting this body.

Dr. Moorehead: I accept that explanation.

In regard to the question of expense in getting out the glossary and the matter of income from it later on, that is all right if you guarantee the advance cost. The commission is

perfectly willing to go ahead if the guarantee is behind it. There will necessarily be some expense growing out of work of this kind. For instance, whoever is chairman of the Commission, will need a stenographer who shall give a considerable amount of time to the work. If some member, willing to take up this task, has a good stenographer with plenty of time, he should be selected as chairman, otherwise a modicum of funds should be at his disposal to cover the necessary expense incident to the work.

As to the question of extending this glossary to include the whole wide world, I think it is just as well to stay on this side of the Atlantic Ocean for the present.

After one has given this thing a good deal of thought he feels like exclaiming, "Who is equal to this task?" It is simply overwhelming. Dr. Guilford, perhaps better than any man in this room, or better than any dentist in America, could give you, if he would, some reasonable measure of the responsibility and the bigness of the undertaking. It is almost incomprehensible.

In the last analysis this thing will have to be more or less arbitrary. Every term will have to be edited in more or less arbitrary manner, and then it will have to go out like the individual and stand the stress and strain of activity in the dental world. And more than that, the work will have to be revised from time to time as the profession grows, and that revision will not be difficult because there will be a basis to work to, and any publishing house will be glad then to make the revisions. You have beautifully answered the call for a few dollars to-night. It is perfectly exhilarating to the chairman of the commission, to hear you say, "We will stand behind you and give you the necessary, reasonable support." I can tell you right now that this is going to develop into a broader matter than you think it will. A commission is not likely to give of time and strength under such encouragement. Each of you will have to get back of this thing, because it is a tremendous undertaking. The work will require much time. I am not in any position now to propose what I would myself consider a sane, sensible plan. The only thing that we can do is what Dr. Guilford has been striving to do, to continue in his process of compilation until we get to a point where some publishing house will come to our rescue and take the burden off our hands.

The question of a lexicographer alone is perplexing. Every one of these words will have to be submitted to a lexicographer, a man skilled in the interpretation and construction of language. And this is the biggest argument for turning the matter over to a publishing house, because they already have such an individual for the task.

I can not see anything more in the present year than simply going ahead with lots of patriotism,—and it may be that by next year this organization will be so ashamed of itself it will be willing to pay the reasonable expenses to keep the wheels from squeaking.

SUGGESTIONS REGARDING THE TEACHING OF PROSTHETIC DENTISTRY.

DR. HERBERT LOCKE WHEELER.

Prosthesis means "the replacement of an absent part by an artificial one." Persons who replace lost arms, legs, or eyes, practice prosthesis as well as the dentist.

To teach prosthetic dentistry properly is to enforce a course of manual training upon the students. Manual training should train the hand and mind. The mind may be educated without training the hands, but the hands may not be trained without developing the mind. Manual training is based upon a philosophy that is sound in that it shortens the time between thinking and doing, and gives a mental control that produces dexterity and skill. Man excels the higher anthropoids almost as much in hand power as in mind, which seems to indicate that the hand is a potent instrument to open the intellect as well as in training sense and will. Of the one to two hundred occupations enumerated by the census as involving manual work, there are none that require greater hand versatility than dentistry, and no department of dentistry to such an extent as the prosthetic.

H. T. Bailey has said that a master in art craft must have a four-fold equipment:

"1. Ability to grasp an idea and embody it.

2. Power to use all nerves, and a wide repertory of methods, devices, recipes, discoveries, machines, etc.

3. Knowledge of the history of the craft.

4. Skill in technical processes."

The first is what the student should have when received by the dental college; the others are what we should give him. Science, which is the real basis of all prosthetic teaching, is scarcely touched by most of our schools. Remember, we are teaching prothesis for the sake of enabling some one to create a product. The tools used are but a means to an end. The desired result prompts the invention of the tools. A thorough knowledge of instruments is necessary; an ability to produce the desired product is essential.

Training to make a good prosthetic dentist will make a student self-reliant and self-respecting, stimulating him to look upon exactness as a form of truthfulness. The day of the mere professor who deals in alleged knowledge is gone. The day of the doer who creates has arrived. Prosthetic dentistry to be mastered requires something more than a prosaic literary description of processes and results. The present amount of time possible to secure for the teaching of prosthesis in the regular dental course will not produce a skilful man. A good plumber could not be made in twice the time we use in the regular dental college course to teach prosthetic work.

Such observations as I have been able to make indicate that the beginning and the end of the teaching of Prosthetic Dentistry, is, with many, merely instruction in prosthetic mechanics. As we know, for many years that which has been taught in dental prosthetics has been designated as Mechanical Dentistry. Much that is written and taught at the present time in this department is mechanical,—nothing more. The same thing is done in all cases, as though the human mouth was always run in the same mould. Such questions as the direction of stress, arranging for occlusion that will permit of proper powers of mastication, and allowing for idiosyncrasies of the individual patient are seldom considered. Even now when the man skilled in practical prosthesis knows that an anatomcal articulator is essential, most colleges require the student to purchase and use the absurd and useless plain line articulator. Those who have observed must have noticed that the Creator has somewhat surpassed the human architect in that all of his productions vary. The outlines and structure are never exactly the same.

In the last few years there has arisen much confusion in the teaching profession as to what teaching really means. There

seems to have been a wave of mental aberration passing over the country which has caused many people to look upon a mere statement of opinion and alleged facts as a sufficient method of instructing and educating. Purveyors of information, such as the daily press and periodicals, have assumed and presumed to become teachers rather than merely distributors of various kinds of information. Dentistry, as well as other branches of learning, has been invaded by the charlatan, the quack, and the empiric in teaching. Often their philosophy of instruction has included but a minute portion of the methodical training needed to educate, and that portion often erroneous.

This has resulted in an avalanche of articles in the current journals, reprints, circulars, and plain advertising matter by interested parties, being widely circulated. This in turn has resulted in much of this professional literary riff-raff being taught from the forum as material worthy of repetition and consideration. Only those strongly fortified with a deep sense of discrimination can continuously train and educate the young amongst the present literary vagabondage of the dental profession.

To teach Prosthetic Dentistry so it will be a training as well as an accomplishment means that the teacher must be something more, much more than a mechanical dentist. To be taught Prosthetic Dentistry means that the student when graduated should know much more than the bare principles of mechanics involved in the movements of the mandible and the production of the artificial substitute. There are certain fundamentals which it is necessary to know before one can properly consider the securing of models upon which to build something more than artificial makeshifts. In order to know what is required, the student must be able to realize the necessary ultimate result; more than this, the student must be taught and trained what instruments and materials are necessary, and how to use them to produce an appliance that will meet all demands, and that will be in harmony with aesthetic appearances and the needs of utility.

The student should be taught Histology so that he will know the kind of tissue cell composing the mucous membrane of the aveolar and palatal portion of the superior maxillae and the mandible; also Anatomy so that he will understand the muscular attachments to the palatal bones and the maxillae and

contiguous territory. He should know the relation of the mandible to the glenoid-fossa and the muscles that control its movements. He should understand the eminentia articularis and excursions of the condyle. Until these facts are thoroughly drilled into his mind he is unfit for further instruction. After mastering these he should be taught to know pathological conditions, when they are present, and what to do to remedy them. Until all of this is well-mastered, a student cannot begin to intelligently understand the mechanical and artistic parts of prosthesis. It would be as reasonable for the civil or mechanical engineer to be taught the construction of the supporting girders of the bridge without a thorough knowledge of the character of the foundations upon which the abutments are to rest as it is to attempt to teach prosthetic dentistry until a thorough knowledge of the anatomy and histology of the parts have been inculcated.

How shall he be taught the various mechanical and artistic qualities necessary to make him at once a high class and competent artisan and a professional gentleman? The didactic teaching alone of our colleges would not accomplish this in ten years, perhaps never, though the lectures are an essential part of the college course. The mere showing of models, manikins, or patterns will not accomplish the desired result, though this is as essential or more so than lectures. Does it not then appear that the student must not only be taught the fundamentals of Histology, Anatomy, Bacteriology, and Pathology, but his mnd must be trained to so control his fingers that he can technically perform competently any act required to produce a proper prosthetic appliance. He must also know concerning the various substances and implements utilized in making such an appliance and substitutes needed in prosthetic dentistry.

To obtain the requisite training of mind and fingers, and to secure a working knowledge of substances, appliances, and materials, the length of time required varies with each individual. In all cases the time required is greater than that necessary to master the didactic part. Unless colleges are organized and equipped so as to secure almost constant and daily work in the laboratory under exceedingly competent instruction, it is utterly impossible to produce an ability on the part of the student to do proper and satisfactory prosthetic dental work.

There must be not only the necessary models and illustrations for teaching purposes, but there must also be teachers and instructors of sufficient ability to use these so as to show the students the various steps from cause to effect. This means that facts not only have to be stated and shown, but oft reiterated.

The question has been asked how much time should be spent in didactic teaching, how much in the laboratory and how much in the infirmary. This is a difficult question to answer, for the reason that it would depend largely how the work was divided in each of the three years. In the first year, considering now prosthetic teaching alone, the amount of work required in the laboratory on technical work should be from ten to eighteen hours per week; while the didactic work need not require any more than two or three hours weekly, with no infirmary work. In the Junior year there should be the same time for didactic work as in the Freshman year. The laboratory time may be shortened and what is taken from the laboratory hours may be given to the infirmary work. Generally speaking, in the second year one-third of the time should be spent in the infirmary, leaving two-thirds to be utilized in the laboratory and didactic work. In the Senior year very little time is required in the laboratory, and the didactic work should continue to use about the same amount of time as in the other years. The laboratory does not require more than three to six hours per week at the outside, and the remaining seven to twelve hours weekly should be spent in the infirmary.

In making these suggestions, for they are but suggestions, the difficulty of stating a definite time for any institution or for individuals is fully recognized. They are made only as suggestions to bring out if possible criticisms and discussion. They are based in a general way upon what we are trying to do in the Prosthetic Department of the College of Dental and Oral Surgery of New York. It must be borne in mind that the amount of time required to train an individual to become a skilful worker in prosthetic dentistry depends upon

1. The ancestry of the individual.
2. The ability of the teacher.

This again is profoundly modified by the equipment and environment furnished by the institution and the will and ambition of the student.

One thing should be realized by all teachers and demonstrators, and I might add, critics;—an education cannot be bestowed. It must be achieved. It cannot be given. It has to be acquired by hard, industrious repetition. Teachers do not educate students; they educate themselves so that they may direct the student's energies in such a way that he may by his own zeal and industry acquire the education.

DISCUSSION.

Dr. A. W. Jarman, Philadelphia

I want to congratulate Dr. Wheeler upon his paper on the subject of Prosthetic Dentistry, which is, as was brought out by our president in his address, one of the branches upon which the dental schools bestow most of their attention, for, accordng to the catalogues, more hours are devoted to the teaching of prosthetic dentistry than to any other subject.

One important phase referred to by Dr. Wheeler is relative to commercialism in prosthetic dentistry, and there is the question of the commmercial dental laboratories and how far this matter is going to sway prosthetic dentistry. In our large cities, laboratories are growing more numerous each year, and finally it will be for teaching bodies such as this to decide how much of prosthesis is to be taught by the profession and how much is to be left for these outside laboratories. It is a matter that can be hardly determined at the present time as to just what the outcome of it will be. Some men who have come into the dental profession from the medical profession have predicted that it is only a question of time when the teaching of dentistry and the practice of dentistry would come down to the point of the operative part being done by the practitioner while the prosthetic portion of the work would be largely carried on in the same manner as artificial eyes and limbs, and all that sort of thing, as are made for the medical profession. I should hope that time will never come.

It seems to be impossible to conduct a dental school without devoting a large amount of time to prosthetic dentistry, taking in Crown and Bridgework and all its allied branches. The teaching of prosthetic dentistry must include laboratory instruction, and the theoretical and the practical work, as was

brought out yesterday by Dr. Thornton and several other speakers.

How often in undergraduate schools do we hear the statement made by students that they have too much theory and too little practice. Too many men are inclined not to give proper consideration to the amount of study necessary in the pursuit of dentistry. As students they are not capable of seeing the application of the subject of anatomy, of the subject of physiology, of the subject of general histology, to dentistry. They simply want to take that portion of these subjects which pertains to the teeth, and throw all the remaining knowledge aside. It is difficult to make them understand that the theory so-called, or the scientific education in the principles underlying their special line of work, is really fundamental. We should teach them their true application. Through the raising of entrance requirements, and securing in consequence a better educated class of students, this problem of a broader professional education is being gradually solved. A matriculant should possess scientific knowledge of the underlying principles of dentistry as contained in physics, chemistry, mechanics, etc. How much bearing a mechanical training such as obtained in manual training schools has upon a prospective matriculant and his future in dentistry, I do not know; but, from the standpoint of reason, it seems to me that it would not be detrimental. If the requirements for entrance to our dental schools were based, as Dr. Brophy says, not simply on college graduation, or a degree of some sort which allows him to enter a professional institution, but more upon the previous acquirement of knowledge of such branches as are considered necessary for the intelligent study of dentistry—the amount of physics necessary, the amount of chemistry necessary, etc., and have that standard established for entrance to our dental schools.

As to mechanical ability, the desirability of its possession by students of dentistry cannot be denied. Some men possess it, and some men acquire it. If a man is possessed of mechanical ability he is to be congratulated, because in his school work it seems to be second nature for him to construct the various mechanical appliances required and to accomplish his practical work in an efficient manner without apparent effort. Other students not possessing mechanical ability have to struggle along during their course, and it is very difficult for them to ac-

complish their requirements. Men of this class often make fair operative dentists, but have no desire to do mechanical dentistry. In practice they send the prosthetic work to the dental laboratory, ofttimes asking the laboratory men how to make impressions, and sometimes, in the larger cities, even sending patients for the purpose of having impressions taken, claiming that they do not want the dirt and trouble around their offices; therefore, these men do not themselves really possess the mechanical ability necessary to form the connecting link between their knowledge of dentistry and the work to be done. From a teacher's standpoint it is interesting to know whether it is the fault of the teaching that this knowledge is not imparted, or whether the responsibility rests alone with the inability of the student.

Dr. Wheeler refers to the plumber. We are all familiar with the wages earned by the plumber. Those of us who have a house to keep up or a dental school to be equipped, know what we have to pay the plumber. They always base their pay on the standard of the hour. Perhaps this is the reason I oppose placing dentists' pay by the hour standard, preferring to charge as per service.

There is nothing truer than the statement that "we have to be shown," like the man from Missouri, and in coming to Ann Arbor we have found it very helpful, not only in getting our share of stimulation by breathing the invigorating air of this climate, but also by taking in new ideas which will prevent us from growing old and set in our ways. Now, we must "show men," and Dr. Wheeler refers to the fact that they have to be shown as well as taught by didactic teaching.

Teachers do not always have the ability to stand up and paint such word pictures that students can understand just what they are talking about, or grasp the idea they intend to convey by the word-picture they are trying to paint. The work of Drs. Black and Cattell, and others, in forming a method for teaching the Technique of dentistry has made it easier to train students than was formerly the case, as they enter clinics now with an idea of the real technique of what they are to do; but notwithstanding all this, in teaching postgraduate work we find in some instances men who do not know how to go ahead with practical work, even though they have passed the examination of the State Board and have done the work required of them.

They may have the theory in mind, and can answer questions, but when they are asked to produce they often fall down; therefore, to show students as well as to tell them how to do the work should constitute an important part of our dental teaching.

Dr. Wheeler also brings up the question of anticipating results. If we could only impress upon a man how much it means not only to recognize the conditions in the mouth, but also to understand them and be able to anticipate and see in his mind's eye how the work will look when finished, or, in other words, the completed work. This will help an operator greatly, for it gives him a training along a line that he has something to work to, a definite goal. If we can get a student interested along these lines I feel that we shall have wonderful results, and there are ways in which we can exact this training through a process of gradations.

The matter of ancestry of individuals and the development of teachers was mentioned by the essayist. Of course, we might consider this point in connection with the mechanical skill a man naturally possesses. Oliver Wendell Holmes says that a man's training begins 250 years before he is born. I have had students whose fathers and brothers were engineers, whose lifelong training had been along mechanical lines, and these students seemed to be endowed by nature to grasp mechanical principles.

The subject of ability of the teacher would seem to all of us to be of too personal a nature to be discussed at the present time. We all think we have some ability in the teaching line, or we would not be here.

As to men who come from the undergraduate schools for post graduate work, and by postgraduate work we mean such training as would fit them for practice, or correcting such shortcomings as they might have, or to supply the requisite link which may have been missed in their teaching. Many men cannot apply principles from the three years' instruction they have received. When we get a man who has the theory, and yet who, from lack of personal instruction, has failed to learn how to apply those principles, we can by direct personal teaching, or coaching, put him on the right road; thus we are doing something not only for dentistry, but also for the public upon whom

he is to practice. The essential part in all our work should be to give the student training of such a character that he will be able to apply the underlying principles to the work in hand, so that should a case be a little different from any that he has ever seen, he can think and plan a way to do the work.

When Dr. Black was reading his paper and giving us the suggestion of the split course, and the various subjects to fill in our four years of instruction, it occurred to me it might be a good plan to establish chairs of applied subjects; for instance, our students to take up physiology and learn it in a general way. In our institutions men receive instruction in general physiology, general anatomy, general chemistry, general histology and bacteriology. If we could have applied chairs in these subjects, as have been established in some of the medical schools for the purpose of applying a particular subject to regular practice, this would enable the student to have a comprehensive idea of the worth of the subjects he has studied, and their application to his every day practice in the future.

Dr. N. S. Hoff, Ann Arbor

I can not fully discuss Dr. Wheeler's paper without referring also to the papers of Dr. Hipple and Dr. Bush; and I do not care to discuss all these valuable contributions to the subject under consideration. I will only select a few suggestions that seem important to me.

Dr. Wheeler might have elaborated his paper to a greater extent, or at least given us a smaller number of topics to consider, thereby saving in the discussion the repetition of statements made in the paper.

In a general way, as teachers, we not only have to consider all instruction from the art or the craftsman's standpoint, but we must teach our students to a large extent to be craftsmen as well. I sometimes think we are doing too much technic work, that we are producing craftsmen, and cultivating manual training to an excess. And yet we cannot get away from that fact, that we must develop men of skill for the present at least, if they are to take up modern practical dentistry and do it as we wish and as we think it should be done for our private patients.

Dentistry has developed beyond what our ancestors ever dreamed of when they began to practice artistic dentistry. Thirty or forty years ago we had a man named Varney who was a

skilful gold worker. We had another man who killed himself filling teeth, Marshall Webb. We had men around the country doing beautiful work. I remember seeing Dr. Corydon Palmer, when I was a student, taking the bite for an upper and lower set of teeth for continuous gum work, and he put a lot more time and care on the work, it seemed to me, than was really necessary. But the results of his efforts were not only mechanically perfect, but artistically most satisfactory. Many men in our profession today are doing the same things in almost all lines. We have developed our profession almost to the limit along the lines of technical skill. It is time we have made some progress in the scientific development of our art.

Several years ago we received a letter from the dean of one of the dental schools in Germany asking us to send him a crown and bridge instructor, who could spend a few weeks in his school and teach his students American crown and bridgework. We happened to have a man who spoke German, a good workman, a very intelligent man, and we sent him. When he returned he reported that he had had a good time, but he doubted if he taught anybody anything. He reported that as long as he would sit before the class and work they were all attention, but when he asked them to do the work themselves they said, "No we only want to know how; we shall hire a technician for the purpose." They were most willing, however, to study all the collateral sciences most thoroughly. On the contrary we have spent most of our time in developing the technical side of the subject, we have put our emphasis upon the matter of developing the handcraft, or, if you please, the mechanics, as Dr. Wheeler intimates we have been doing. We are compelled by our traditions to make mechanics, but now we are beginning to realize that we must educate our mechanics until they understand the principles involved. Hence it becomes necessary for us to study the scientific principles involved in our mechanics. We must not only teach our students how to run the machine and to know what the machine is for, and even to build it so as to get the greatest efficiency out of it, but he must know the scientific reasons as to why he does things with the machine. This seems to be the theme that has been running through all the discussions of this meeting.

The question of intelligence, of course, involves a whole lot of things, but intelligence is just as fundamental as mechanics to the making of a dentist.

Dr. Wheeler says that mechanicians are born, not made. I do not believe that at all; I never could believe it. I know some good mechanics that have been made. They have made themselves simply because they have become interested, they have put their hearts and souls into the work, and they have developed themselves. We may see that all the time in our teaching work. Some men start out as though they would not make dentists at all, but by thorough training and proper inspiration from the teachers these men do finally develop into good technical men, and more than that, they sometimes develop into good scientific men, and often into the best of professional men. In all our teaching the thing that we should strive to accomplish above all else is to impress upon the mind of the students the fact that we expect them to develop into capable as well as ethical professional men.

Dr. Wheeler intimates that we have charlatans in our profession and that dentistry is degenerating into simply a mechanical art. I do not think so. Prosthetic dentistry was never on so high a plane as it is today. Formerly but few men had a high conception of the subject while today more men are doing efficient prosthetic dentistry than ever before. They are not doing it because they are skillful craftsmen or skillful technicians, but because they have reasoned it out, they have learned to appreciate the values in it from the professional standpoint.

In this connection I trust all of you teachers who are interested in this phase of teaching will look carefully into our technical methods, not because we have anything to offer that is particularly new or valuable, but we invite your criticism. If you see anything that we are not doing properly, or to the best advantage, we want you to tell us about it. That is one of the things I hope we shall get out of this meeting and that is the principal reason why we wanted to hold the meeting in this building instead of in the hotel. We are conducting our school this week just as it is done every other week in the year.

We are doing the technic work as thoroughly as we know, and to the best advantage we can under our circumstances and environment. We try to introduce into our technic instruction the scientific as well as the artistic reason for it, so far as we are capable of doing this. We are also endeavoring to apply the fundamental principles which our students are taught in the scientific departments.

Along with the technic instruction, we give a didactic course, which is intended to explain and amplify the technical course. I believe it is a mistake to teach any of our so-called practical subjects without a more comprehensive presentation of it in the didactic form. I think I could not fully impress my subject unless I had a chance to go before the students and look them in the face and tell them what my personal attitude might be in regard to these things and the reasons therefor. I want to enlist their sympathies not only from the standpoint of how to do things, the fundamental principles involved, and their relations historically and professionally. We can explain some things better from the rostrum than in any other way.

There is hardly a lecture in which I do not refer to the ethics of the work, directing the students' attention, not only to the way in which it is done, but to reason why we are doing it that way for the benefit of the patient and also giving the professional viewpoint of the work as far as is possible. I believe we can do much to interest students in such a subject as prosthetic dentistry, which a great many dentists do not care for at all. We can more effectively teach our students to take greater interest in the mechanics, in the art of prosthesis, and stimulate a desire to acquire a higher grade of skill by considering the ethical position which that work ought to have in our practices.

I believe this kind of teaching should be carried not only into the prosthetic instruction, but into the operative, surgical, therapeutic, and into every other department of technical instruction. If every teacher would strive to emphasize his subject from the mechanical, the artistic, and the professional side, we would then be making professional dentists.

Dr. J. E. Nyce, New York

Dr. Wheeler referred to the matter of manual training. Students or mechanics or prosthetic dentists, are born to a great extent. And I feel that I am able to prove this conclusion by reason of quite a few years spent in teaching prosthetic dentistry in several cities of the country. The final result depends on how they come to us and what we do for them.

There are just a few points I want to bring up because I feel that they are important. In the first place, even before a

student starts to do a piece of prosthetic work, we should thoroughly teach him the anatomy of the oral cavity. It is, I believe, our duty to start in at the beginning of the freshman year to teach the students the anatomy of the oral cavity and all parts pertaining to it. The relation of the mandible to the glenoid fossa is most important. If this fossa is a deep one or a shallow one, this makes a difference in the condyle path. The relation of the eminentia articularis should be taken into consideration and the student should receive instruction as to the position it occupies in that path. He ought to be taught the attachment of the muscles which elevate the mandible and what forces oppose those elevators in depressing the mandible; what structures to look for, or what to overcome, in regard to faulty extraction when a case presents for artificial work. Too often in the extraction of teeth part of the process is removed, the muscle attachments encroach upon that process, but the student has not been shown or told anything regarding this possible complication. In the third year he perhaps goes to the infirmary to take an impression, and he does not know why he sees certain little lines running up here and there and what they mean in his work. He does not know that these indicate an important attachment or muscle that he must look out for. The student is taught to believe that the anatomical articulator covers every defect and remedies every imperfection in the occlusion of teeth. The anatomical articulator has a most important place in the setting up of teeth, but the one natural articulator is overlooked to a great extent, that is, the mandible. In setting up a set of teeth, the student is taught that if he gets the occlusion correct through the aid of the anatomical articulator and the use of the face-bow, this ends it. But that does not end it, it is only the beginning. After placing those teeth in the mouth he must be able to find out just where one little point may be too high or too low. He must be taught to use articulating paper to find out just where there is a triturating motion along with the up-and-down, or hinge motion.

The next important point is not only to put a competent superintendent in charge of the department, but to have instructors who are able to show, by transfer from the mind to the fingers, just what is necessary to be carried out. It is difficult in the lecture-room to impress upon the student your own personality and what should and should not be done. He has

no conception of what you are trying to tell him unless you are able to transfer that lecture to the laboratory. You must have a set of models and each step of the work should be shown there so he can see each step that is to be taken as he proceeds in the work. Then the demonstrators, the superintendent, or the professor of that subject, should be able to go before the class and do that same piece of work and show all these steps. Not simply to say, there is the model, there is the impression, there is the base plate, and there is the way the teeth should be set up, that is the way you take your measurements. You should be able to do all this before the class. A class of 100 would be easy to handle in that way. In my freshman class I am handling about 250 men. We overcome the difficulty in this case by dividing the class into sections, and each demonstrator must show the class a step in the work. We also quiz them in sections, which we find most beneficial, because that is the time the student can ask questions and find out things. We have in other words a sort of conversational meeting, when we arouse their curiosity and find out just what they want to know and what they are thinking about. It is a good method.

A statement has been made in regard to which I am going to take issue: That there are more dentists doing prosthetic dentistry than ever. I beg to differ, and would say that in our larger cities are laboratories whose receipts are anywhere from $50,000 to $100,000 per year for laboratory work, and those figures can be proven. I was in a laboratory not long ago when a dentist practising in one of our large cities came in and even asked this man who had never been graduated from a school of dentistry, "How shall I prepare to take a bite for a full upper and lower denture?" That is where his school, and other schools of the country, I believe, have not been doing their duty. We should begin in the freshman year to teach our students how to take a bite, how to take impressions, what materials to use and why we use them, how to put on base plates, why we set up teeth this way or that way; not simply set up these teeth and put them in the mouth—that is where the great trouble lies. In order to make an efficient prosthetic dentist, it is necessary to give the "whys" and "wherefores," and this is our plain duty. And the foundation for the proper study of the subject is, I believe, in starting to teach the anatomy of the oral cavity at the very beginning of the freshman year.

Dr. A. W. Thornton, Montreal

Specialization in work is simply a recognition of the great principle that men do best that which they do most frequently, and there is an economic reason for it. The man practising operative dentistry a few hours, then doing crown and bridgework, etc., recognizes the fact that he can not do prosthetic work as well as can the man who is making plates every day in the year, and there is a reason for all this. It is a strenuous life and a commercial idea. The general practitioner realizes that he can make more money at other things, and that is why the work is sent out. So I do not think we should jump too hard on the men who send their prosthetic work out to be done.

Dr. J. A. Gardner, Memphis

The main reason for not sending prosthetic pieces to the laboratory man is due to the fact that in his work along purely commercial lines he loses most of the underlying principles that are so necessary to be brought out in the technic pieces. I see much of that kind of work, and, as a speaker has said, one of our greatest difficulties is to get a method of teaching that will bring out clearly the fundamental principles. I know of no method that will do that more effectually than will mechanical principles applied to the mouth and the defects pointed out in the mouth.

This reminds me of a story. A Sunday-school boy was asked by his teacher if he did not think it paid to be a good boy. He said he did not know, but guessed he didn't think so. She insisted that if he was a good boy when he got to heaven he would have a gold crown. He replied, "Nixey on that gold crown; my father has one and he has been cussing it ever since."

There are a lot of things which, if not worked out, like the scientific principles underlying construction, will cause the appliance to be a thing of discomfort to the wearer and an annoyance to the dentist. The crisis in dentistry that we have heard about is due to the fact that we are just coming out of the darkness, as it were, into the light. We are just beginning to learn how to apply mechanics, we are getting the scientific principles hooked up with the universal law governing mechanical detail.

Dr. Fred W. Gethro, Chicago

I would like to call attention to Dr. Wheeler's suggestion of 20 hours a week. This would be practically 3 1-2 hours per day. If we devoted to operative dentistry the same number of hours that would make 7 hours, then we could assign the remaining hour to the various other branches. Attention has not been called to that point, and I simply mention it.

Dr. Wheeler, (Closing the Discussion)

You gentlemen have got me into heaps of difficulty. In the first place, either I am unable to write the English language correctly, or some of my good friends are unable to understand it.

I will begin first with our distinguished President. I think I said 10 to 18 hours technic work and two hours lecture work. Furthermore, we put in about nine hours a day instead of eight. Every one imagines that New Yorkers go to work at ten in the morning and quit at two. I know a man in New York who is probably as successful financially and in every other way as any other man of whom I know in the profession in America, whose office is in the same building and practically in the same apartments as mine, and I have never but once been able to get to the office before he did. I have arrived at the office as early as 7:30 and he was there. I think he must get there at 6:30 or 7; but the problem is too much for me; I can not find it out. He is the Dean of our college. So you see he has a faculty for working.

Dr. Hoff remarked that he thought my paper needed elaboration. I did not think that I was addressing a kindergarten, and I do not think so yet, but I am at sea; my faith has been somewhat shaken since coming here.

I infer from a remark made by Professor Hoff that in his opinion the technical part, the manual training part, was the lower part and was less honorable than the other. I must say that I take decided issue with the Professor on that point, and I regret that he is not present just now because I like to look at a man when I am answering anything that he has said.

In this connection I wish to call your attention to a few cases of Americans who are fairly well known, and I think scarcely any of us would question their standing either in

America or in the world at large. And, strange as it may seem, those men came through a course which required considerable technical skill on their part of one kind or another.

The father of our country, George Washington, was a civil engineer, and I fancy rather an excellent and competent one.

Abraham Lincoln made a reputation as a rail-splitter and a navigator of flat boats on the Mississippi, and this career seemed not to have any influence in preventing him from becoming a man of some character and ability.

James A. Garfield drove mules on a canal-boat, and a man who drives mules has to learn to be active in a muscular way oft-times, as those of you who live where mules are raised know. Therefore, I think it may be said that Garfield had some technical ability also.

I must say that I have no thought that it is possible to maintain that because a thing has to be done by fingercraft it is less honorable or shows less ability or less of a gentleman, than a thing which is merely worked out by mental gymnastics.

Professor Hoff remarked that the inference was given in my paper that mechanics were born, not made. Now, really, I do not know where he found it; I can not find it, and I have looked the paper over several times. It may be that my ability to express myself is faulty. I said: "It must be borne in mind that the amount of time required to train an individual to become a skillful worker in prosthetic dentistry, depends upon (1) the ancestry of the individual." But that is not saying that men possessing mechanical ability are born, not made. It is saying that if you have a student in your college who descends from a family who have been in a special line of work for many generations, which has taught them to use their hands or fingers, then, unless there is something mentally wrong with the individual, he will adapt himself more quickly to your teaching and learn to do the work more rapidly and more accurately than the boy whose parents have not had that kind of an ancestry. And I think there is no one here who can or will deny that. The fact is made too plain in everyday life of those who are teaching.

Another thing that Dr. Hoff inferred was that my remarks indicated that the stress was laid upon making a me-

chanic and not a professional gentleman. Now, I do not know where I said that. I did say, "Training to make a good prosthetic dentist will make a student self-reliant and self-respecting," and if you know of any better foundation for a professional gentleman than that I would be pleased to have your definition. I also said in regard to the prosthetic dentist, "How shall he be taught the various mechanical and artistic qualities necessary to make him at once a high-class and competent artisan and a professional gentleman?" I think I made that "professional gentleman" sufficiently distinct so that the average man could understanding the meaning thereof.

I also laid great stress upon the question of having a thorough knowledge of the collateral branches, a knowledge of the surrounding parts, and the various forces that are related to the work which we are obliged to construct, and I think that knowledge makes for a broad-minded professional gentleman. There is much that I did not say, to be sure. But I confess for one (and as I have written many papers perhaps I can say this with more freedom than would be possible otherwise) that in my opinion the average paper read before a dental organization is too long, altogether too long; it wearies the audience and leaves them so fagged that oft-times they have not energy enough to give their best to the discussion.

There is one thing more. Dr. Thornton gave the inference that he objected to the idea that it was derogatory to send work to the prosthetic laboratory. Now, it is not necessarily derogatory to send all your work to the prosthetic laboratory if you wish, but unless you train the dentist so that that work can be constructed on scientific lines, on hygienic lines, on aesthetic and utilitarian lines—and to do that he must know the subject,—he is not going to get that kind of work from the prosthetic laboratory. The prosthetic laboratory can not furnish it except the model and knowledge exist in the mind of the man who orders it; and he must make the plans and do the fitting.

One thing I would criticise right here. There was read here last night a sort of a curriculum or syllabus for prosthetic work. And the very first line of the requirements mentioned the name of a type of impression, the designation being based upon the names of the two men who devised the method. Now, one of the men who was named there is a genius, but he has so

limited a preliminary education that it is impossible for him to enter a dental college. The dental colleges have tried to help him, he has tried to get in, but he can not do it. He does not understand and can not learn the scientific principles upon which this work is constructed, and yet he advertises, and is advertised and supported by those interested, to give courses to graduates of our dental colleges, and some go there and take courses. There isn't any question in my mind but that he is able to give them instruction, but he should not be able to give them instruction. The discredit is not on his side; it is on the side of the men who are teaching in the dental colleges. And when we do not give instruction equal to such teachers we are deteriorating; we are laying plans to destroy that part of dental education which requires a knowledge of creating substitutes for lost parts, and that is the foundation of dentistry.

OPERATIVE DENTISTRY.

DR. A. H. HIPPLE, OMAHA.

In all of our colleges operative dentistry is taught in the lecture room, in the technic laboratory, and in the infirmary. In the lecture room the student is taught the principles that underlie all dental operations. In the technic laboratory he performs operations upon inanimate objects, not only for the purpose of fixing the principles in his mind, but in order that his hand and his eye may be trained as well. In the infirmary the student is taught to apply all that he has learned in the lecture room, and all the skill that he has acquired in the laboratory, to the treatment of oral lesions, under conditions approximating those of a private practice.

I believe that the instruction should be given in the order named. I believe that class-room instruction should precede the work of the technic laboratory, and that the student should be taught what he is going to do, and how he is going to do it, before he attempts any operation. I know that some of our best teachers consider that until a student has actually performed an operation, or at least attempted it, he will derive little benefit from any lecture on the subject. They tell us that students learn by doing, which is true. They tell us that students who have attempted operations and have failed will pay closer attention to a dissertation on the subject than those who

have had no practical experience, which may also be true; and, acting in accordance with these ideas, it is the custom in some schools to have the students perform a variety of operations in the technic laboratory before taking up the lecture course. So eminent an authority as Dr. Black, in his monumental work on Operative Dentistry, recommends that Volume II, which deals with technical procedures in Filling Teeth, be given as a text-book to the freshman class, and completed during the junior year, and that Volume I, whch treats of the Pathology of the Hard Tissues of the Teeth, be studied during the senior year. In other words, the treatment of the disease is to be studied before the disease itself. As a reason for this recommendation, he says that "In order to read understandingly of typhoid fever, for instance, one must have had much practical observation of the disease." The truth of this is obvious, but it is also obviously true that unless one knows what typhoid fever is, what tissues are involved, and something about their pathology, he will not be able to observe understandingly. As a matter of fact, the more a man knows about the pathology of typhoid fever, the more he will learn from clinical observation; and the more clinical experience he has had, the better he will be able to understand its pathology. The same is true of our lecture and laboratory courses. To get the best results, in my opinion, we must carry them on together, with the class-room instruction in advance of the laboratory work. Three years is a very short time in which to give a student the theoretical knowledge and the practical training necessary to fit him for his life's work. We all realize that we ought to have four years. In order to make the most of what time we have, however, I believe that the lecture course in operative dentistry should start with the beginning of the freshman year, and end with the close of the senior year, and that during that entire time the student should be doing practical work of some sort, although not necessarily of a strictly operative nature.

While the lecture course should be arranged so as to cover the ground systematically, I do not think that it should be divided in such a way that the subject matter of each year will be separate and distinct from that of the others. That method may be applicable to some of the branches of our curriculum, but not to operative dentistry. A student will absorb a certain amount of information in regard to an operation when it is first explained to him in the lecture room, but when he at-

tempts it in the laboratory he will usually find that his knowledge is very incomplete. The next time he hears it explained he will understand it better, and when he has actually performed the operation on a patient he will be able to understand things which otherwise would be almost meaningless to him. Our teaching must be graded, and adapted to the comprehension and capabilities of our students. In describing an operation to freshmen we should confine ourselves to those things that a freshman can understand, but a senior is able to appreciate instruction of an advanced character, and is entitled to receive it. Each class, in my judgment, should be handled separately, and receive its own course of lectures.

When I speak of instruction in the lecture room I do not mean cut and dried lectures, read or recited to the class. If the teacher has nothing to offer his students but a mass of facts, to be taken down in the form of notes and memorized, I think it would be better to have the student do his practical work first. What I mean by lecture room instruction is real instruction, the kind that trains the perceptive powers of the student, that makes him think, that leads him from the known to the unknown and really educates him. Let me illustrate what I mean. Suppose we wish to teach a class of freshmen the form that is to be given to a simple occlusal cavity. We might tell them that the outline of the cavity should include all fissures, that the floor or seat of the cavity should be flat, that the surrounding walls should meet the seat practically at right angles, that the margins of the cavity should be bevelled, and so on. We might tell them these things, and we might force them to memorize the facts, but we would not be teaching them very much. I think a better method would be to proceed somewhat as follows: Ask the students what we aim to accomplish by filling such a cavity, and by successive questions, if necessary, develop the idea that we are trying to arrest decay, to prevent its recurrence, and to permanently restore the original form of the tooth. Get them to see that in order to arrest decay and prevent its recurrence all tissue that is affected, and all tissue that is likely to become affected, must be removed; and when that is clear in their minds they will understand that all fissures must be included, and will have a very fair idea of what must be the outline form of the cavity. Next tell them that such a cavity should be given the form of a box. At once they think of packing-boxes or crayon boxes and when

some one is asked to describe a box he describes a rectangular one. Someone else is asked to suggest other forms, such as the candy boxes used by confectioners, with the result that square, round, oval and heart-shaped boxes are mentioned. A little further questioning brings out the fact that much as these boxes may differ in their general form, they all have two things in common; each has a flat bottom, and the surrounding walls or sides meet this bottom at right angles, and at this point the teacher is able to emphasize the fact that that is what is meant when we say that a cavity should be given a box-like form. They may then be asked why the cavity should be given a flat seat. Nobody knows. Two or three guess and guess wrongly. The teacher rapidly sketches the outline of a molar on the board, and shows a cavity with a concave pulpal wall. He sketches another with a cavity having a flat pulpal wall. With colored chalk he shows a filling in each cavity, and indicates the cusp of an opposing tooth pressing against each filling near its margin, and asks the class what happens. They tell him that the first filling rolls, and that the other remains stationary. At this point the teacher uses the term "resistance form" for the first time, and talks about it for a few minutes, not so much for the purpose of teaching them something as to crystallize in their minds what they have already learned. In a similar way retention form, bevelled margins, and the other important details of a proper cavity form may be taught, and I contend that the student who has learned the how and the why of these things in the lecture room will do his work in the technic laboratory more intelligently, will do it better, and will derive more benefit from it, than the student who carves a cavity as he is told to carve it by the demonstrator, without knowing what he is doing, or why he is doing it.

In teaching operative dentistry the problem of combining oral instruction with the study of text books in such a way as to get the best results is, to my mind, a most serious one. It may be that some teachers have solved this problem, but I cannot claim to have done so. I have tried the lecture method with collateral reading of the text book, and I have tried the assigned lesson and recitation method, and neither has been entirely satisfactory. At the present time I am using a combination of the two methods that suits me better than either, but I realize that it is a compromise rather than a scientific method of teaching. On this phase of my subject, therefore, I shall

content myself with a brief recital of my own experience, and a suggestion or two based upon that experience, in the hope that they will stimulate a helpful discussion.

For some years I used the lecture method exclusively. I made my lectures as interesting as possible. I endeavored to make everything so plain that the dullest student could not fail to understand it. The students approved of my method. They learned the theoretical part of operative dentistry almost without effort, by absorption. Of course I urged them to supplement my lectures by reading of the text book, but few of them did so. What was the result? When those students graduated they were narrow. They knew my favorite methods. They were familiar with my pet expressions, and some of them could give a very good imitation of my gestures and facial expressions; but all they knew about the subject was what they had obtained from me, and what was worse they did not know how to obtain additional information. They were not familiar with their text book. They did not know what it contained or how to use it. Occasionally I would receive letters from recent graduates asking questions, the answers to which could have been obtained from any book on the subject. I finally came to the conclusion that any system of teaching which takes into consideration only those things which must be learned in college, and does not prepare the student to continue his studies after he has graduated, is more or less of a failure. I became convinced that the student should be made familiar with the contents of at least one text book on operative dentistry, and so I decided to change my system and adopt the recitation method. I tried it for a year, or rather part of a year. My experiment with the freshmen lasted, I think, about three weeks. It took me just about that long to find out that they could not read the text book understandingly. In our school we use the American Text book of Operative Dentistry. As it aims to cover the entire subject, it naturally starts out with a description of the teeth, and in the opening paragraph, in order that the student may have a clear idea of what he is going to study, the following definition of teeth is given: "The teeth are, morphologically, transformed tissues, belonging to the tegumentary system of animals, and are hard, calcareous bodies, situated in the oral cavity, at the anterior orifice of the alimentary canal." Now what does that mean to a freshman? What does he know about morphology, or transformed tissues, or the tegumentary system of animals?

He is to be congratulated if his preliminary education has taught him what the alimentary canal is, and where its anterior orifice is located.

I wish that somebody would write a book—a little book—on operative dentistry for freshmen. In that book I wish that he would tell the freshman the things he ought to know about operative dentistry, in language that he could understand. I don't think such a book should be a compend, or anything of that sort. It should be a real text-book that would serve as an introduction to the subject. Such books are available for the beginner in Latin, of Chemistry, and should be available for the beginner in operative dentistry.

While each freshman in our school is required to have a copy of the prescribed text, and while I assign certain pages here and there to be read, nearly all my teaching of the freshman class takes the form of lectures and demonstrations. To the juniors and seniors, however, I assign a certain number of pages to be studied, and prepare questions based upon the text. No one knows who is to be called upon to answer any particular question, as no regular order is followed, and the question is always stated before the student's name is announced. I have before me a quiz book, and the students know that every answer is graded, and that the record is taken into consideration in the final summing up of their work. This compels them to study, which is one of the chief advantages of the recitation method. But I do not confine myself to any regular routine. One day I may ask twenty or thirty questions based upon the text, and the next day only five or six. Sometimes the students ask me more questions than I ask them. Sometimes we devote the entire hour to a discussion of one or two phases of our subject, and occasionally we get off the subject entirely. It may not be scientific teaching, and my methods could hardly be called systematic, but I cannot help feeling that in conducting these informal discussions, where the interest of the student is aroused, his imagination excited, and his reasoning powers brought into action, I am doing my best teaching. At any rate I have the consolation of knowing that although I may not have covered the entire subject assigned for the lesson, the students have read the text and have some knowledge of it.

We all appreciate the great value of the technic laboratory in teaching operative dentistry. The introduction of the tech-

nic course revolutionized the work of our colleges. It is based upon sound teaching principles, it is adapted to the needs of our students, and it gives excellent results. As dental teachers we owe a debt of gratitude to Dr. Black, Dr. Weeks, and Dr. Cattell, who were the pioneers in developing this most important feature of dental pedagogics. I shall not enter into any discussion of what should be included in a technic course, or how the teaching should be conducted. We have a commission on that subject which makes valuable reports, and we have an exhibit, from either of which much more can be learned than could possibly be gathered from anything I might say on the subject.

While there may be much room for improvement in our didactic teaching, and while we may still have much to learn in regard to laboratory methods, I believe that the most imperative demand at the present time is for better teaching in our infirmaries. As a matter of fact, we are just beginning to realize that teaching is called for in the infirmary. We are still too apt to regard the clinic room as a place where the student puts into practice what he has been taught elsewhere. We look upon it as a place where the student gains experience rather than knowledge. Of course the experience is necessary, and its importance to the student can hardly be over-estimated, but we have too largely overlooked the opportunities for effective teaching in connection with it. We do not even prepare for it. We divide our teaching staff into three classes—professors, lecturers, and demonstrators, and we all know what that classification means. The selection of a professor is a matter that calls for careful consideration as to fitness and ability, but the selection of a demonstrator is too frequently a matter of finding some recent graduate who can be induced to accept a nominal salary for his services. Many schools still seem to think that they have done their full duty to the infirmary when they have placed a competent superintendent in charge of it. But that is not enough. He must have competent assistants. How many demonstrators are selected because of their teaching ability? Yet I submit that a demonstrator who is competent and knows how to teach, can do more effective work standing beside the chair of an operating student than can any professor in the lecture room. We need more demonstrators and better demonstrators, and we need them badly.

I have referred to the importance of scientific teaching in connection with class-room work, and I wish to emphasize its importance in infirmary teaching as well. In this connection we should remember that no student will take as much interest in a mental picture of a tooth, or even in a drawing or model, as he will in a tooth in the mouth of a patient. The teacher standing before his class may grow eloquent in pointing out why a faulty cavity preparation will probably be followed by recurring decay, and how such a result may be avoided, without making a very lasting impression upon the mind of a student; but if that student is asked to replace a filling that has failed in a patient's mouth, and is made to study the reasons for the failure, and then correct the conditions by a proper cavity preparation and filling, the impression is likely to be lasting. But the desired effect will not be produced unless the demonstrator uses proper teaching methods. Suppose, for instance, that decay has occurred at the bucco-gingival and linguo-gingival angles of a proximo occlusal cavity. The demonstrator might tell the student that the decay was due to the fact that the outline of the cavity had not been sufficiently extended, and direct him to remove the filling, extend the cavity buccally and lingually and give it a flat gingival wall. If the student carried out the instructions he would be learning something, of course, but how much more he would learn if the demonstrator were to question him regarding the movements of food at that point during mastication, the presence or absence of a contact point, the condition of the inter-proximal gum tissue, the relation of the gingival margin to the free margin of the gum, the width of the embrasures and the general tendency of the teeth to decay. Having had class-room instruction in regard to all these things, a little study of the case would enable the student to answer intelli gently, and the bearing of these conditions upon the case involved would be impressed upon him. It would no longer be to him simply a filling that had failed, or even a filling that had failed because of improper cavity preparation. He would understand why that particular cavity required a certain kind of preparation to insure permanence of the filling, and under the guidance of the demonstrator would be able to work out the details intelligently. Our students must be taught to observe and to think, but unless we make special efforts to develop in them the faculties of observation and reason they will look at things without seeing them, and do their work mechanically.

I have used cavity preparation as an illustration, but similar methods may be applied to the teaching of every department of operative dentistry, and incidentally, I may say, to every department of infirmary practice.

In teaching operative dentistry clinically the teacher has opportunities for emphasizing much of what the student has previously learned. The ideal condition which we are trying to bring about in the mouth suggests physiology, the forms of the teeth recall dental anatomy, cavity preparation is based upon histology, extension for prevention comes from a knowledge of pathology, purulent conditions are explained by bacteriology, bleaching teeth is nothing but applied chemistry, and making an inlay that will fit a cavity, we have recently learned, is simply a matter of physics.

Are we availing ourselves of the teaching opportunities thus presented? Are our demonstrators qualified to do this work? If they are qualified, have we enough of them so that they have the time to do it? If not, why not?

DISCUSSION

Dr. L. P. Hall, Ann Arbor

In discussing Dr. Hipple's paper I shall say only a few things as to how we teach this subject. I think our teaching force gives more time per man than is usually given in most schools. All of our professors are also demonstrators, they work at the chairs and do every kind of work the student is asked to do during the entire clinic hours and instructors do the same. Our patients are assigned from one department and a record is made of everything that needs to be done for a patient, whether it be operative, crown and bridge, or prosthetic work. We do not take into account the orthodontic work except early in the session, as we can not take care of work of this nature that is presented late in the session. For making the examination and working record we have a duplicate sheet somewhat after the Bannister system of records, upon which are shown the permanent teeth and below these a good representation of the deciduous teeth. The permanent teeth, 16 above and 16 below, are numbered in this way: Beginning on the upper right side, we number from upper right 3rd molar, 1, 2, 3, etc., around to and including upper 3rd molar as

No. 16 on the left side, then drop to the lower left third molar which is No. 17, and then on around to the lower third molar on the right side, which is No. 32. The deciduous teeth are numbered the same as the permanent teeth that are to follow them. If we want to record an operation on a deciduous tooth, for instance, the upper right second deciduous molar, we call that No. 4-D because it occupies the same position as that occupied by the second bicuspid on that side, which is No. 4.

In making a record of the cavity to be filled, those of you familiar with the Bannister system know that the mesial cavities are marked No. 1 on the diagram, distal No. 2 and occlusal No. 5. But instead of writing out the whole thing, we put down the number of the tooth, and just above and to the right in smaller figures No. 1, or No. 2, according to whether the cavity is located mesially or distally as 3, indicating a mesial cavity in upper right first molar. The student soon becomes accustomed to this manner of marking. If the filling material is gold, as is usually the case, they place 3 on the line designated "gold fillings," or if the material is to be amalgam or porcelain, this is correspondingly indicated.

Our students used to say that their patients did not return because they did not know there was anything more to be done. Now the student tears off the original examination sheet and gives it to the clerk at the desk and keeps the carbon copy for reference. The carrying out of this system accomplishes two things: It shows the patient how much work there is to be done in his mouth, for he may from time to time consult this record in order to know whether he is getting all the work done that is needed, and the student's attention is called to cavities that he would otherwise overlook by reason of deposits on the teeth, or because of the slight difference in the color of the overlying structure he might not recognize the presence of a cavity below the contact point which has not perhaps broken through, and which one accustomed to examining many cases would readily detect. And again this serves to suggest to the students the fact that careful examination is always necessary.

As a rule the patient is assigned but once and the student is supposed to make the next appointment with that patient when it is convenient both for himself and for the patient. He treats the patient as he would treat him in his own office. We assign to each student his own chair and his own cabinet and he

occupies that position the year through. We expect him to keep everything in a nice, clean condition, to have his instruments in proper order and always sterilized. If the patient objects to going on with all the work that we have outlined as the removal of amalgam fillings to be replaced with gold, etc., he of course can stop the work at any point, but as a rule, we encourage the patient and operator to the end that the mouth be put in complete order at once, or as soon as it can conveniently be put so.

We do not commence as early as the freshman year to teach operative dentistry, although we begin the teaching of operative technic at the beginning of the second year in a laboratory course. Dental anatomy is given in the first year, and the technical course in the Junior year consists of making instruments, tooth sections, cavity preparation in enlarged models and extracted natural teeth, etc. This course occupies ten hours per week during the first semester. Our Juniors take up the clinic work the second semester, and we introduce them through the simpler operations. We assign a Junior to chair work with a Senior, and he at first acts as an assistant to the Senior, the Senior turning over to him such operations as he is capable of undertaking. In this way he learns to prepare the mouth for operative procedures and is given a chance to see the more complex treatments and to assist in making them.

In addition to the operative technic course we have two courses of lectures, one by Professor Ward covering the physical properties of filling materials, etc., another by the writer, on clinical methods. Both these courses are given in the senior year.

In the lecture course we tell the students again, as they were told in the Junior technic course, first how to treat the smaller and simpler cavities, how to prepare them, as well as we can, although perhaps not so skilfully as Dr. Hipple has described it to you, the idea being to carry them along from the simpler technical steps to the larger and more complicated. For instance I say to the class, "It is difficult to tell you just how to begin all cases. Some of you will have simple cavities, some proximal cavities in incisors, and some mesial and distal proximals in molars." You will meet some difficult cavities the very first day. If you get one of those large proximal cavities in a molar, do not attempt a complete operation, but clean it out

as you have been instructed, put in a temporary filling and let the patient go until later in the year, or until you have had more experience. We do not want the patient to sit all the afternoon for the purpose of having a student attempt to put in a gold filling and not have a good result in the end. When we start the students to work for the patients we want them to do the simpler treatments first. In that way they become acquainted with the patient, and the patient is able to tolerate the work of that student. It is only once in a long time that it happens that a patient requests to be changed from one operator to another, and usually for some personal reason. It is our endeavor to keep this system in operation so that if there is any trouble we have the opportunity of being able to find out on whom to lay the blame.

As regards demonstrators, as I have stated, all of our professors are demonstrators, and our instructors are also demonstrators and we have the regular so-called demonstrators. It is a pretty difficult thing, as you all know, to find good operators who are at the same time competent demonstrators. Many operators who put in beautiful fillings can not tell anybody else how to do it. We select our demonstrators each year from the graduating class, and it is a difficult thing to find always capable graduating students to take the place of demonstrators. I should like to make the election to that position a sort of prize, have it competitive, so that only the very best students would apply for that position. In the paper read this morning the author said that he had to hunt around for somebody who was willing to take a small compensation. We put it to the students a little differently from that. We realize that we are offering a small compensation when we pay capable men only $500 for nine months service, but we make them feel that the position is worth a great deal more than the money value. The men who have gone out from our school heretofore have said to us that they derived a great deal of benefit from their teaching experience. Sometimes we select the wrong men, but this year we have a fine class of demonstrators who are serving us well and at the same time getting a great deal of invaluable training. We have had the good fortune to have one or two of our best demonstrators remain an additional year at slightly increased salary, but can not expect to have our best instructors stay with us many years.

As Dr. Moorehead remarked yesterday, it is a bad proposition to have too many instructors of the same subject; it is better to keep the subjects under a few heads and have them all work together. In the demonstration room we have men who teach therapeutics, men who teach crown and bridgework, and so on through the various departments, and we try to do our work in harmony. We may have some differences of opinion, but we try to keep them to ourselves, working in such a way that everything will move along smoothly. For example, in the afternoon the students are supposed to do only operative work, but often times we permit them to prepare crowns and bridges and do treatments at the same time.

Dr. A. W. Thornton, Montreal

I enjoyed reading Dr. Hipple's paper. Consciously or unconsciously he enunciated a great principle. There is a method of teaching called the inductive method, or the process of leading the mind from the known to the unknown. That is evidently the process that Dr. Hipple follows. The question in my mind is whether we are not having our students do too much.

In connection with the principle which has just been enunciated, I remember that some years ago, while living in a small Canadian town, there was a colored man named Senex Bannister, who evidently had that idea in mind. He was frequently brought before the magistrate for doing things he ought not to do, and in giving evidence he always indulged in most exalted, grandiloquent language. On one occasion the magistrate said, "Stop right there, you must give your evidence in the ordinary language of the ordinary people." Senex looked at him for a moment and then said, "You' honah, Ah don't know as Ah should be held 'sponsible foh the ignorance of this Cou't." So it may be that we should not be held responsible for the ignorance of our students, but we must recognize their limitations and lead them—not drive, but lead them—to the point at which we wish to leave them.

CROWN AND BRIDGEWORK.

A. J. BUSH, D.D.S.

When the Chairman of the Program Committee selected the writer of this paper he may have acted upon the supposition that every teacher of crown and bridgework has a view-point,

and has, according to his view-point, satisfactorily solved the problem of teaching the subject.

In view of being permitted to place this modest construction upon the Chairman's behavior, the writer, therefore, promptly accepted the honor, first, because of the universal belief, unsupported by facts, that every teacher in this field is making a conscientious effort to teach the art of crown and bridgework according to his view-point, and second, because of the notion entertained by some that the proficiency of the average student in the class room, laboratory and infirmary, may in a sense, bear a direct ratio to his instructional advantages.

While the writer is prepared to assume all responsibility regarding his view-point, he is not prepared to offer any evidence in support of the notion that student proficiency is the only legitimate offspring that can be produced by instructional efficiency. Neither does he care to prove that student insufficiency is the only legitimate offspring of instructional inefficiency.

However, since the practice of crown and bridgework is a scientific pursuit, requiring specialized knowledge, as well as specialized skill, and since the Dental College is the only logical institution from which this specialized knowledge may be disseminated, it is obvious therefore that a great responsibility devolves upon those who assume the obligations of teaching, and furthermore, that those who occupy the positions of teachers should express their viewpoints to each other in the common effort to increase the character of their instructional service.

Because of the rapid advancement made in the practice of crown and bridgework during the last half century, and in view of the phenomenal development of bridgework in the last decade especially, most teachers in this field no doubt have found it difficult to preserve the student's mind free from confusion in about the same ratio as the various methods and numerous modifications of procedures have been multiplied.

While much has been accomplished toward the formulation of principles and requirements governing their indications, contra-indications, adaptation and construction, in an effort to place crown and bridgework on a more scientific and teachable basis, yet confusion still confronts our efforts in this direction and the reason becomes very apparent when we stop to con-

sider that every teacher of crown and bridgework in the average dental college essays to teach the average student the principle and requirements, indications and contra-indications and methods of construction of any one of fifty thousand or more possible bridge replacements that may present for solution in one little oral cavity.

"Multiplicity of Methods" therefore is no longer an empty phrase and its significance becomes more apparent when it is known that, according to my unabridged classification, one method alone is flexible enough, under ordinary conditions, to be applicable to any one or more of 4410 different conditions which may be present in any one mouth.

In view of these considerations, we may safely assert that the teaching of crown and bridgework in the modern dental college is a task which has resolved itself into a problem of no small proportions and one which seems of enough moment to demand that every teacher of this subject should at least have given it enough serious consideration to justify his possession of a view-point.

In giving you my view, I assume two things, both of which I believe may be accepted as facts without argument. First, that crowns and bridges are employed in the effort to increase the usefulness of the dental apparatus which has been impaired by the partial or total loss of a few teeth, and second, that the practice of crown and bridgework should be taught in accordance with the correct principles and requirements which govern their employment.

It is obvious therefore that the teaching of the principles and requirements become of first importance and serves as the only possible foundation upon which methods of restoration may be correctly taught.

Every student should be taught that success can be achieved only through a strict compliance with the principles and requirements and conversely that failures are invariably the direct result of their non-observance, that crown and bridgework should not be practiced with the thought of rendering a service to his patients by increasing the functional efficiency of the dental apparatus through the mechanical requirements alone, but furthermore, that the physiological and hygienic requirements must also be observed, lest this attempt to increase

the functional efficiency of the dental apparatus be more than offset by establishing conditions which may prove far more serious to the patient than would be caused by the impairment of the dental apparatus through the physical loss of the few teeth he is striving to replace.

The greatest proposition that confronts the teachers of crown and bridgework in our dental colleges today, is the problem of teaching a more lively respect for the requirements, to instill into the student's mind a more thorough regard for their importance, a more intelligent conception of their true significance, and to bring the student into a fuller realization that the most valuable lesson that can be learned regarding the five requirements is the fact that only one of the five is mechanical.

My view-point relative to this phase of the subject may be best stated by saying that humanity, enlightened by the oral hygiene and prophylaxis propaganda wll sooner or later demand that all of the requirements be observed in the practice of crown and bridgework and that sooner or later teachers in this field will be compelled by a long suffering public to place less emphasis upon the mechanical and esthetic requirement, except as a means to gain an end, and devote more time to the teaching of those requirements, which, from a humanitarian standpoint are more vital and which in fact constitute the essential consideration underlying the physical diagnosis of oral conditions which demand the execution of these mechanical prescriptions as applied to living tissues, namely the physiological and hygienic.

A practical knowledge of the correlated sciences of anatomy, physiology, physics, metallurgy, orthodontia, and oral pathology and physiology as viewed and comprehended by the periodontologist, is presupposed as subjects which are fundamental to the study of the requirements and through the combined consideration of which we form our conceptions regarding indications and contra-indications, and, according to my view-point these correlated subjects are so fundamental to the scientific teaching of crown and bridgework that this fact alone would justify our giving them a prominent position in the dental curriculum, even in the absence of any other consideration.

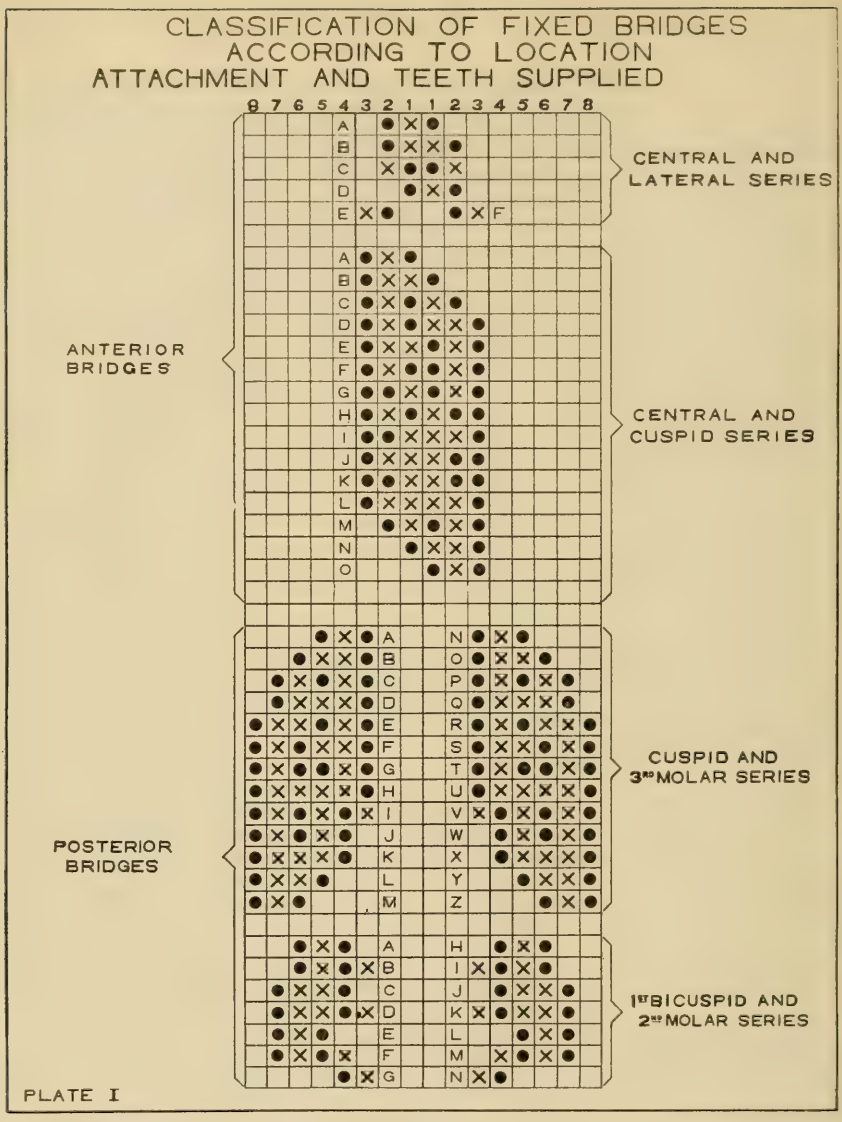
My view-point relative to the teaching of the principles which govern the employment of fixed bridgework and my idea regarding the best plan of teaching methods are incorporated in the following classification of fixed bridgework based upon a proposed law or rule which has been formulated in accordance with accepted principles of practice.

In attempting to classify fixed bridgework I have endeavored, *first,* to broaden the foundation upon which the superstructure of our present conceptions thereof rests, and to establish more thoroughly our comprehension of the principles and their application which constitutes the very substructure of the foundation itself; *second,* to systematize and facilitate the teaching of fixed bridgework in accordance with the accepted principles of practice which govern their employment; and *third,* to formulate a law that embodies the principles which modern practice has approved, a law which will assist in teaching the proper selection of abutments according to principle, for the support and retention of fixed bridgework, and one which will likewise impose restrictions to the employment of those types of construction which are from the standpoint of principle, indefensible.

The *terminology* used in the classification is simply a correlation of terms selected from our nomenclature, that constant usage has rendered familiar, and which have been selected because they seem to be the most expressive of any terms available.

Most writers of dentistry, in referring to teeth of certain position in the arch, have used the terms anterior teeth and posterior teeth as convey the idea of the best calculated to association between object and position, likewise anterior and posterior have been used as the most expressive terms in referring to bridge replacements that supply a missing tooth, or group of teeth in either of these locations.

Accordingly, then, fixed bridgework applied and confined within these limits may be divided into anterior bridges and posterior bridges.


CLASSIFICATION OF FIXED BRIDGES
ACCORDING TO LOCATION
ATTACHMENT AND TEETH SUPPLIED
9 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8
CENTRAL AND LATERAL SERIES
ANTERIOR BRIDGES
CENTRAL AND CUSPID SERIES
CUSPID AND 3RD MOLAR SERIES
POSTERIOR BRIDGES
1ST BICUSPID AND 2ND MOLAR SERIES
PLATE I

In referring to Plate I, illustrating possible fixed bridge replacements, it will be observed that the bridges represented as applicable to the various positions arrange themselves into well defined groups that are characterized by the teeth chosen for abutments in connection with the tooth or teeth supplied. Accordingly, therefore, anterior bridges may be subdivided into a central and lateral series, and a central and cuspid series; likewise, posterior bridges may be subdivided into a cuspid and third molar series, and a first bicuspid and second molar series.

SIMPLE BRIDGES.

A single bridge of any one of the above series may be said to form a simple bridge.

COMPOUND BRIDGES.

Any bridge that can be effected by connecting *unilaterally,* any one of the simple bridges forming either of the anterior series, with any one of the simple bridges forming either of the posterior series, may be said to form a *compound bridge.*

Any bridge that can be effected by connecting bilaterially any one of the simple bridges forming either of the anterior series wtih any one of the simple bridges forming either of the posterior series, may be said to form a complex bridge.

Classification of FIXED BRIDGEWORK

- **Simple Bridges**
  - Anterior
    - Central and Lateral Series
    - Central and Cuspid Series
  - Posterior
    - Cuspid and 3rd Molar Series
    - 1st Bicuspid and 2nd Molar Series
- **Compound Bridges**
  - Central and Lateral Series joined to Right or Left
    - Cuspid and 3rd Molar Series
    - 1st B. and 2nd M. Series
  - Central and Cuspid Series joined to Right or Left
    - Cuspid and 3rd Molar Series
    - 1st B. and 2nd M. Series
- **Complex Bridges**
  - Central and Lateral Series connecting
    - R. and L. Cuspid and 3rd M. Series
    - R. and L. 1st B. and 2nd M. Series
    - R. Cuspid and 3rd M. Series with L. 1st B. and 2nd M. Series.
    - L. Cuspid and 3rd M. Series with R. 1st B. and 2nd M. Series.
  - Central and Cuspid Series connecting
    - R. and L. Cuspid and 3rd M. Series
    - R. and L. 1st B. and 2nd M. Series
    - R. Cuspid and 3rd M. Series with L. 1st B. and 2nd M. Series
    - L. Cuspid and 3rd M. Series with R. 1st B. and 2nd M. Series

To recapitulate, first, fixed bridgework may be divided according to extension, into simple, compound and complex bridges; second, simple bridges according to location, may be divided into anterior and posterior bridges; third, according to attachment and teeth supplied, simple anterior bridges may be subdivided into a central and lateral series, and a central and cuspid series, and simple posterior bridges may be subdivided into a cuspid and third molar series, and a first bicuspid and second molar series; and fourth, the simple bridges of the anterior series when joined unilaterally and bilaterally to the simple bridges of the posterior series, form compound and complex bridges respectively. The adjectives upper and lower, right and left, are used as prefixes and complete the terminology.

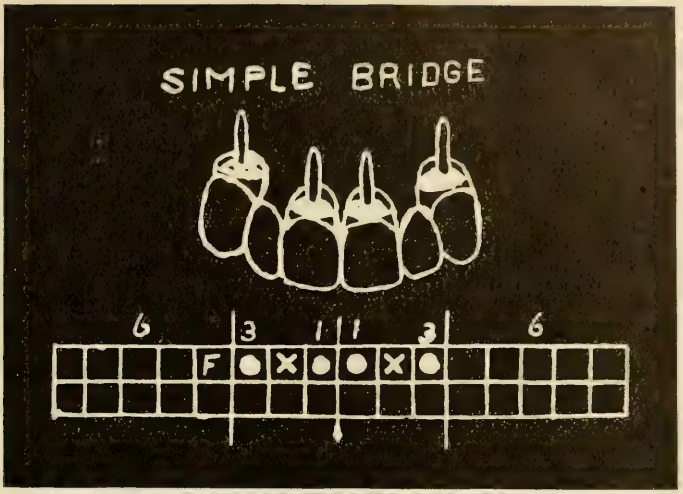
Again referring to Plate I, it will be noticed that all simple bridges are of comparatively straight alignment and have at least one support or attachment at each end, and furthermore, that all the simple bridges of the various series, in being joined or connected to form compound and complex bridges form extended bridges of curved alignment with one or more intervening piers or attachments.

In view of this fact therefore, it seems fitting and much more in accord with the scientific phase of this class of work, that a general law be adopted that will furnish a safe plan for teaching the application of all fixed bridgework in general, and which will serve the same purpose as the various rules that have been formulated from time to time to cover a comparatively small number of cases, more or less typical, all of which are fundamentally based upon the same principles.

PROPOSED LAW.

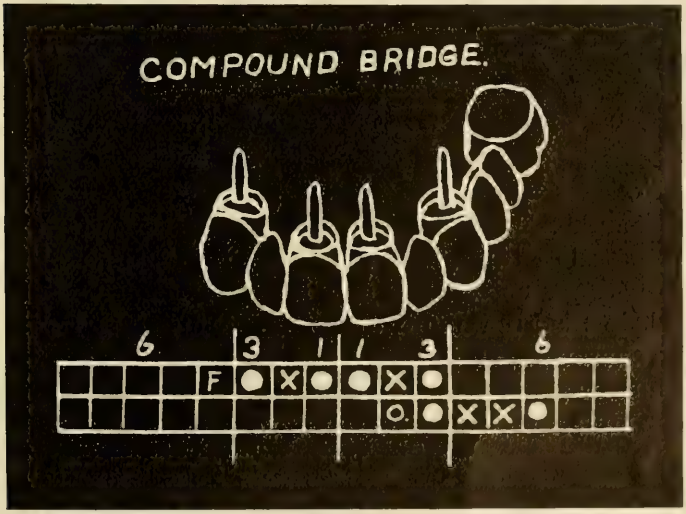
The law proposed is as follows: All fixed bridgework of straight alignment should be attached to, or supported by, one or more abutments at each end, and should receive additional attachment and support from one or more intervening abutments or piers when of curved alignment.

In accordance to the classification and law proposed the following definitions are derived.



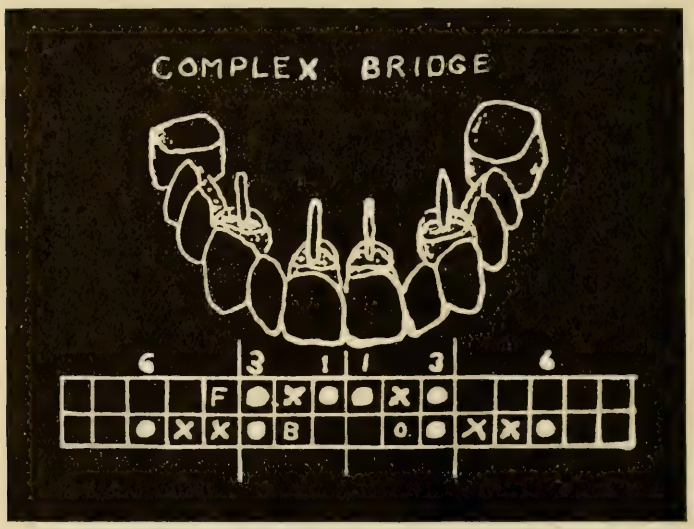
SIMPLE BRIDGE DEFINED.

A simple fixed bridge may be defined as a bridge used to replace one or more teeth missing from the anterior or posterior positions of the arch, attached to or supported by at least one or more abutments at each end and are of comparative straight alignment.



COMPOUND BRIDGE DEFINED.

A compound fixed bridge may be defined as an extended bridge effected by a simple anterior bridge joined unilaterally to a simple posterior bridge to supply two or more missing teeth from the anterior and posterior portions of the arch, attached to or supported by one or more abutments at each end and one or more additional attachments or supports from one or more intervening abutments or piers, and are of curved alignment.



COMPLEX BRIDGE DEFINED.

A complex fixed bridge may be defined as an extended bridge effected by connecting a simple anterior bridge bilaterally with a simple posterior bridge to supply four or more missing teeth in the arch and are attached to or supported by one or more abutments at each end and one or more additional attachments or supports from one or more intervening abutments or piers, and are of curved alignment.

ARGUMENTS IN SUPPORT OF THE CLASSIFICATION AND LAW PROPOSED.

In support of the proposed classification and in defense of the law which embodies the principles upon which the classification is largely based, I wish to quote the following taken from a former paper:

"If the muscles of mastication are capable of exerting a stress of 275 pounds upon the first molars and if the supporting tissues of the first molars have been capable of developing a structure which will safely bear such a strain, it must be concluded that the development of the muscles and the supporting tissues of the teeth are coincident and in accordance with physiological laws.

"It is also true that this muscular power is normally intended to be exerted within physiological directions, and that the supporting tissues of the teeth are developed and physiologically designed to receive and support this strain only when this muscular stress is transmitted to them in a normal direction and according to physiological principles.

"The wonderful power that the muscles of mastication are capable of exerting, and the wonderful plan upon which Nature has constructed the human teeth in order to utilize this energy in the mastication of food, and the wonderful design of the tissues which support the teeth while performing these functions, all seem to be in perfect accord with the marvelous schemes of Nature. Yet, it must be remembered that this muscular energy is intended to be exerted only within certain limitations, bounded by the normal, and the design of the teeth render them efficacious in performing their functions only when muscular energy propels them normally, and that the tissues which support the teeth while performing their functions are capable of yielding normal support only when the muscular stress of mastication is normally directed.

"Therefore, it would not be in accordance with physiological laws to expect a first molar which, if normally capable of withstanding a stress of 275 pounds, and the supporting tissues normally capable of resisting the stress, to physiologically resist this stress if the direction of the stress be perverted, and the supporting tissues compelled to receive the stress contrary to the direction that they are normally designed to receive it.

"Hence, it seems obvious that if fixed bridgework be constructed with occlusal and incisal masticating surfaces after Nature's plan and in accordance with physiological law governing normal articulation and occlusion, and if the stress as received by the abutments is normally directed, that such bridgework may be successfully attached to the roots of the teeth without inviting pathological manifestations."

But, on the other hand, if fixed bridgework be constructed without due regard for these principles, and the occlusal or incisal surface be so made as to abnormally direct the resultant force to the abutment teeth, or the employment of abutments be such as to subject them to stress perverted through leverage, then will the supporting tissues surrounding the root fail to render support, just in proportion as the stress is perverted and the supporting tissues are obliged to offer resistance in a direction which they were never intended to furnish.

Unquestionably, there are many fixed bridges outside the scope of this proposed law and classification which are apparently giving good service, and which, by reason of this apparent service, and their continued employment, have thus, seemingly, been sanctioned as good practice; nevertheless, the soundness of the principles underlying the proposed law cannot be questioned, neither can it be denied that these same bridges in question might have rendered a still greater service had they been effected more strictly in accordance with the principles involved.

Showing series classification of simple bridges according to location, attachment and teeth supplied. The incompleted bridges E and F of the Central and Lateral Series, also G and N of the First Bicuspid and Second Molar Series, when joined form simple bridges EG and FN and are classified as anterior bridges and enumerated as belonging to the Central and Cuspid Series—both, however, retain their identity when used to form other combinations and are enumerated.

The incompleted bridge C of the Central and Lateral Series is not classified as a simple bridge, but when joined bilaterally to the simple bridges of the posterior series it assists in the formation of compelx bridges and is so enumerated. Likewise, incompleted bridges I and V of the Cuspid and Third

Molar Series and B, D, and F and I, K. M, of the First Bicuspid and the Second Molar series are not classified as simple brdges, but when joined unilaterally and bilaterally to the simple bridges of the anterior series they assist in the formation of compound and complex bridges and are so enumerated.

The two groups of simple bridges comprising the two anterior series, effect eight different combinations when joined unilaterally with the four groups of simple bridges comprising the two posterior Series, thus forming eight groups of compound bridges. Likewise the two groups of simple bridges comprising the two anterior Series effect eight different combinations when joined bilaterally with the various groups of simple bridges which comprise the two posterior Series, thus forming eight groups of complex bridges.

Showing compound bridges formed by Central and Lateral Series joined unilaterally to Left Cuspid and Third Molar Series, also Central and Lateral Series joined unilaterally to Right Cuspid and Third Molar Series.

Showing compound bridges formed by Central and Lateral Series joined unilaterally with Left First Bicuspid and Second Molar Series also Central and Lateral Series joined unilaterally to Right First Bicuspid and Second Molar Series.

Showing compound bridges formed by Central and Cuspid Series joined unilaterally to Right Cuspid and Third Molar Series.

Showing compound bridges formed by Central and Cuspid Series joined unilaterally to Left Cuspid and Third Molar Series.

Showing compound bridges formed by Central and Cuspid Series joined unilaterally to Right First Bicuspid and Second Molar Series.

Showing compound bridges formed by Central and Cuspid Series joined unilaterally to Left First Bicuspid and Second Molar Series.

Showing complex bridges formed by Central and Lateral Series joined bilaterally to Right and Left Cuspid and Third

Molar Series, also complex bridges formed by Central and Lateral Series joined bilaterally to Right and Left Bicuspid Series.

Showing complex bridges formed by Central and Lateral Series joined bilaterally to Right Cuspid and Third Molar Series and Left First Bicuspid and Second Molar Series. Also complex bridges formed by Central and Lateral Series joined bilaterally to Left Cuspid and Third Molar Series and Right First Bicuspid and Second Molar Series.

Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Right and Left Cuspid and Third Molar Series.

Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Right and Left First Bicuspid and Second Molar Series.

Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Right Cuspid and Third Molar Series and Left First Bicuspid and Second Molar Series.

Showing complex bridges formed by Central and Cuspid Series joined bilaterally to Left Cuspid and Third Molar Series and Right First Bicuspid and Second Molar Series.

Showing the total number of fixed bridges, upper and lower, according to proposed classification and law governing their application.

While this classification will render no material assistance in teaching the requirements which are fundamental to teaching of fixed bridgework, and which should be regarded as essential regardless of the plan pursued, still it will, no doubt, prove of great help in teaching the principles of fixed bridgework and prove to be of still greater assistance in the teaching of methods.

TOTAL NUMBER OF FIXED BRIDGES, UPPER & LOWER, ACCORDING TO SERIES CLASSIFICATION AND LAW GOVERNING THEIR APPLICATION.

SIMPLE BRIDGES

Central and Lateral Series	6	
Central and Cuspid Series	34	
Cuspid and Third Molar Series	48	
1st Bicuspid and 2nd Molar Series	12	
		100

COMPOUND BRIDGES

Central and Lateral Series joined to Cuspid and 3rd Molar Series	80	
Central and Lateral Series joined to 1st Bicuspid and Second Molar Series	36	
Central and Cuspid Series joined to Cuspid and 3rd Molar Series	480	
Central and Cuspid Series joined to 1st Bicuspid and 2nd Molar Series	156	
		752

COMPLEX BRIDGES

Central and Lateral Series connecting Right and Left Cuspid and 3rd Molar Series	68	
Central and Lateral Series connecting Right and Left First Bicuspid and 2nd Molar Series	36	
Central and Lateral Series connecting Right Cuspid and 3rd Molar Series with Left 1st Bicuspid and 2nd Molar Series	108	
Central and Lateral Series connecting Left Cuspid and 3rd Molar Series with Right 1st Bicuspid and 2nd Molar Series	108	
Central and Cuspid Series connecting Right and Left Cuspid and 3rd Molar Series	1840	
Central and Cuspid Series connecting Right and Left 1st Bicuspid and 2nd Molar Series	198	
Central and Cuspid Series connecting Right Cuspid and 3rd Molar Series with Left 1st Bicuspid and 2nd Molar Series	600	
Central and Cuspid Series connecting Left Cuspid and 3rd Series with Right 1st Bicuspid and 2nd Molar Series	600	
		3558
Total number of combination		4410

To illustrate: the classification recognizes three divisions of fixed bridgework, namely, simple, compound and complex. Therefore, if the student is taught the construction of each according to any one method, he will have been taught according to the classification, the construction of 4,410 possible bridge replacements.

In a like manner the construction and application of all of the various methods may be taught, and by thus systematizing our efforts avoid the occasions for confusion.

DISCUSSION.

Dr. M. L. Ward, Ann Arbor

I shall be obliged to offer the excuse so often given on occasions such as this, lack of familiarity with the subject matter of the paper. Not seeing a copy of it until yesterday, I have not had opportunity to read it over. But I am not sure that I am as bright as I should have been, or I could have followed the reader more closely than I did.

To teach the construction of 4,410 kinds of bridges seems a big task. I immediately reviewed a dozen of them and have forgotten the rest. I enjoyed the first part of the paper, however, in which the essayist referred to the fact that the proficiency of the students is not in direct ratio with the instruction given, the teaching of principles, requirements, and a number of things of that order. I might have worked on the classification more if I had had time to look it over.

In the early part of the paper was brought out also a difficulty which we have encountered here, and that is the difference in the natural ability of students to take up crown and bridgework. I think every dental teacher has had the experience of finding that some students are natural bridge workers, others are more proficient at the chair, while still others are not very good at either when they get through and have devoted much time to them. Within the last year or two we have had in our school conspicuous examples of the natural ability of some students for mechanics and in those cases we have been let off to a considerable extent in the amount of work that we have had to do. On the contrary, in the cases of those men who have not been naturally inclined to the mechanical portion of the work we have had to devote an immense amount of time.

Dr. Bush has also mentioned the matter of multiplicity of methods. That is a point in regard to which I wish the teachers could help us out. In this state we have to watch the State Board largely. I do not know whether the rest of you have anything of that kind to do or not, but presume you do. I am trying to get away from it a little. Some of the methods demanded by the state boards of the country are obsolete, and I doubt whether they represent an amount of technical ability equal to that involved in some more up-to-date method. In some instances I have had to prepare students especially for

state board examination in certain states by giving them work that was absolutely obsolete, particularly in technic. I refer to such work as two case gold crown. I would prefer to have those students take along that line other things that are more up-to-date and which in my opinion present an equal amount of technical ability. So that our methods of teaching, because of state board examinations, are necessarily multiplied a good deal. I wish we did not have to do that, and also that the state boards would select pieces of work that are more in keeping with present practise. Some do, while many do not.

The essayist brought out a point that is very good and that has troubled me a great deal, and that is the principles and requirements to be applied in teaching a student who has not had much practice in crown and bridgework. It is difficult for me to teach and much more difficult to get it carried out in the mouth. No work I have encountered has given me so much trouble as to have the things I have taught in the class-room carried out at the chair, and it has required close attention to get them carried out.

I was particularly interested in the statement of Dr. Hipple that better teaching in the infirmary is necessary. I can not delegate diagnosis and treatment of cases to any of the instructors or demonstrators. It seems necessary for me to have charge of that work myself. The first year I tried to get this work carried out by others we failed in many cases to secure the results we should have had, and since then I have myself diagnosed the cases and then referred each particular case to the care of a certain demonstrator, making him directly responsible for the care of that case. I have done the class work myself, I have made the diagnosis and carried out the treatment myself in many cases or have inspected the results of treatment, and have instructed the demonstrator in charge that if anything is wrong to notify me. In that way I have been able to get some of the things the essayist has mentioned carried out to my satisfaction. The average crown and bridgework of a student which is not closely supervised by some one of experience, is I believe, pretty poor work as a rule.

Another thing that has bothered us a great deal has been to get students to carry out conscientiously a technic preparation that would enable them to take care of every case that came along. There would be repairs, there would be a fixed

bridge involving anywhere from 3 to 14 teeth, and to prepare the student for all the things that came along in the construction of those cases has been a difficult problem. And we have adopted the method of closely supervising our technic course and putting upon a student a penalty if he does not properly qualify himself for this work. We realize that students sometimes get by us with work that has been done by someone else, and to avoid that and make the student do the work himself we have imposed a penalty. And the student today who destroys work for us in the way of burning gold or breaking facings, pays for it. But above all, it has been difficult to get students to prepare themselves for all emergencies and to carry the work out as we wanted it carried out.

With these suggestions, I would ask for discussion from others in the way of results in teaching the complicated portions of crown and bridge work.

Dr. J. A. Gardner, Memphis

Dr. Bush's paper impressed me very much, especially the classifications. I remember Dr. Thornton's reference to the story of the picture, the pointing out of the defect and this causing the mental suggestion. I have almost become a physical wreck since Dr. Bush reminded us of how much we had been doing in the last year or two—4,410 different pieces. Until he brought out this classification, I did not think it was such a great undertaking. I hope, however, that this will impress upon the operative sections in our schools the importance of this chair and not fuss so much about our taking more time, but on the other hand that they will reduce their time just a little bit in our favor. We have not had sufficient time. That is one of our great difficulties—to give to the prosthetic department, especially in crown and bridgework, sufficient time.

Some suggestions were made as to requiring professors in all departments, especially those dealing in any way with mechanical principles, to become demonstrators. I think nothing is more important than for the theorist to be a practical man also. Let him show to the student the methods to be employed, making his applications in the mouth. In our little school down in Tennessee we make it compulsory for every professor to give a certain amount of time in the laboratory looking after his branch; be it therapeutics, anaesthesia, crown and bridgework, or what it may, he is required to do this.

I do not know just how much time should be taken for crown and bridgework. Dr. Bush says that what he has shown here is only a start; it is just the classification of fixed bridgework. When he classifies movable bridgework and all the other varieties perhaps we will have several millions of pieces, when it might take the entire four years to take care of the crown and bridge section alone.

Dr. Bush,
(Closing the Discussion)

I have very little to say regarding the discussion of my paper, except that I was very much pleased at the nice things that were said, and I assume that those who did not say anything averse, in a way endorsed it.

A little discussion has entered into possibly all three papers as to whether a mechanic is born or made. Since this is perhaps a question of viewpoint, I want to give my viewpoint. I think the mechanic is born the same as an artist is born, the same as the musician is born. And I think possibly the conception that has been expressed hinges on some of the other discussions that have been injected. From the standpoint that the mechanic is born, we have imitators. And it is all right to teach our students in reference to those things that mechanics can do with facility. Now, when we have imitators we have good and poor, the same as good and poor mechanics. A poor imitator is, we might say, a counterfeiter. The whole tendency to the establishment of these laboratories comes from the fact that we have imitators. Those who do this work were not "born mechanics"; they learned it, and the tendency is to let the work go to the laboratory. That may be right or not: I would not attempt to say. Still, I want to believe that it is very difficult to delegate the instruction that should go with the conduct of the ordinary laboratory, and that is what I had in my mind when I referred to the filling of mechanical prescriptions. The dentist does the mouth work and sends the prescription to the laboratory to be filled. The laboratory man returns the work to him and he hands it over to his patient.

REPORT OF DENTAL INDEX BUREAU.

The report of the Dental Index Bureau will be much briefer than I had hoped it would be. Last year in Buffalo you will perhaps remember that there was quite a bit of discussion, the gist of which was that we might expect this year to have at least a volume of the Index ready for distribution to the members of the Institute who had subscribed to it. But the year has gone by without that coming to pass, largely for the reason that Dr. A. D. Black has been too much occupied with other matters to give it the attention which it must have from the master hand to put it through.

Two years ago the discussion on this subject brought out the fact that the Institute considered the Dental Index to be the offspring of the Bureau. Subsequent events have seemed to indicate that it was really A. D. Black's child. But in any event Dr. Black assures me that he has now gotten his matters in such shape that he can take up the Dental Index and that decisive action will actually be had within a comparatively short time.

The problem is rather deep and involved, for the reason that the publication of the Index is not, strictly speaking, a matter pertaining directly to the activities of this body. Teachers are perhaps more interested in it than are the men in the general profession, but actually it is my belief that the Dental Index should be published,—as is the medical index by the American Medical Association,—by the National Dental Association in conjunction with their other literary activities, namely, the putting forth of the National Dental Journal if we ever have one. That seems to be somewhat problematic, and the continued existence of the Dental Index is also problematical. Therefore Dr. Black is not quite sure that it is going to be a good plan to start it, at least for the present, until we are sure of its going to be continued and continued in a proper manner. However, I have every confidence that it will be started and that before another year has gone by we will surely have a definite report upon the matter. I think we can rely now on Dr. Black, as he has got his work in Chicago in such shape that he can look after this matter in the manner it deserves.

I regret more than I can say that it is not possible at this time to present a volume to the Institute. I came here in rather

a disgruntled state of mind because of that fact. But since Dr. Black has assured me that he can take care of it soon, and as he is the man that must do it, I feel better, and in consequence can make this report with a clear conscience.

The financial statement is as follows:

New subscriptions		3
Total subscribers		64
(Note—A clerical error last year accounts for the discrepancy in figures.)		
Total amount received up to Jan. 1, 1915	$1,197 35	
Disbursed	862 87	
Balance in bank, Jan. 1, 1915	334 48	
Interest	12 69	
Total	$ 347 17	
Amount due on subscriptions	$ 537 50	

You will see from this that we have available nearly $900 in assets to go ahead with the work of publication.

As Dr. Black has said, the financial side of the matter is the thing that worries us the least at the present time. I think there is no possible question as to being able to secure the requisite financial support when we once get the volume started and actually published.

The point I desire to particularly bring out is that we believe we have gone too far ahead to go back. We have received nearly $1,200, and have spent over $800 of this in getting the thing started as far along as it is, and I am very sure we are all agreed that the thing must be continued from financial considerations if from no others.

It is very much to be hoped that this matter may not drag along any more, and I feel confident it will not. Decisive action will be taken either one way or the other inside of a year.

J. O. McCALL, Chairman.

REPORT OF THE COMMISSION ON TEXT BOOKS.

Your commission reports that it finds a rapidly increasing interest developing on the part of both the members of the Institute and the writers and publishers of Dental books. The former have visited the room set apart for the book exhibit at

every opportunity afforded and many expressions of appreciation have been heard, which the commission hereby gratefully acknowledges. We wish to commend heartily the action of the local committee in providing a separate room for the book exhibit, thus affording opportunity for quiet and secluded inspection of the books presented. We respectfully recommend that this custom be followed in the future.

Many communications from publishers and writers have been received, indicating a disposition to co-operate heartily with us in whatever we desire to accomplish. Books have been presented to us in manuscript and partially prepared form with requests for inspection and criticism before final revision and publishing.

Authors have conferred personally with the commission for the purpose of ascertaining, as far as possible, the desires of the Institute regarding text book needs. There are some publishers who have not sent publications to this meeting and, in consequence, we are deprived of the opportunity of inspecting some excellent works. Among these are Bennett's "Principles of Dental Surgery" and Widdefield's "Notes on Dental Surgery." Your commission will endeavor to reach every publisher and obtain, as far as possible, every work bearing upon our teaching subjects.

One book, presented in "dummy" form, entitled "Pathology and Bacteriology for Dentists and Dental Students," by Dr. Guthrie McConnell, we find is lacking in that it fails to cover the pathology of the Dental pulp, peridental membrane and hard tissues of the mouth and jaws and diseases associated with these structures. The illustrations of Tuberculosis and other general diseases might better be taken from the mouth than, as shown, from organs far remote from the oral cavity.

We recommend that publishers planning the issuance of books for Dental use, written by Medical writers, should advise such writers to consult with Dental authorities before extensive preparation has been made.

Sixty-seven (67) books were presented by the following publishers:

1. D. Appleton & Co.—5.
2. J. B. Lippincott Co.—4.
3. Lee S. Smith & Son Co.—2.

4. C. V. Mosby Co.—8.
5. F. A. Davis Co.—9.
6. Consolidated Dent. Mfg. Co.—2.
7. Lea & Febiger—13.
8. W. B. Saunders Co.—16.
9. P. Blakiston's Son—7.
10. Ritter & Flebber—1.

Of these twenty-nine (29) are either new or of a later edition than previously reported.

TEXT BOOKS.

7. Wilson: Dental Prosthetics—2nd Ed.
4. Brothers: Jurisprudence.
4. Prinz: Dental Materia Medica & Therapeutics—3rd Ed.
4. Dewey: Orthodontia.
10. Thoma: Oral Anaesthesia.
9. Dalton: Essentials of Orthodontia.
9. Broomell & Fischelis: Anatomy & Histology of the Mouth. 4th Ed.
9. Buckley: Materia Medica & Therapeutics—3rd Ed.
Ball: Essentials of Bacteriology—7th Ed.
8. Hill: Manual of Histology and Organography.
8. Ivy: Applied Anatomy and Oral Surgery.

REFERENCE BOOKS.

7. Burchard & Inglis: Dental Pathology & Therapeutics.
7. Fischer-Riethmuller: Local Anaesthesia in Dentistry.
7. Sturridge: Dental Electro-Therapeutics.
5. Young: Hand-book of Anatomy—4th Ed.
4. Buchanan: Manual of Anatomy (3 vols).
4. Blair: Surgery and Diseases of Mouth and Jaws—2nd Ed.
2. Marshall: Operative Dentistry—4th Ed.
1. Hiss & Zinsser: Text-book of Bacteriology—2nd Ed.
1. Osler: Principles and Practice of Medicine—8th Ed.
9. Tomes: Dental Anatomy—7th Ed.
8. Scudder: Tumors of the Jaw.
8. Allen: Local Anaesthesia.
8. Prentiss: Text-book of Embryology.
8. Metheny: Dissection Methods and Guides.

8. Jordan: General Bacteriology—4th Ed.
8. Dorland: Dictionary—7th Ed.
8. Dorland: Dictionary (Pocket Edition)—8th Ed.
8. Bastedo: Materia Medica & Therapeutics.

(Note—Numbers prefixed indicate publishers according to similarly prefixed numbers on publishers' list.)

Respectfully submitted,

Text-book Commission:

A. E. Webster,
C. J. Grieves,
Ellison Hillyer, Chairman.

DISCUSSION.

Dr. J. B. Willmott, Toronto

I want to make just this suggestion in connection with the discussion yesterday on a dental glossary. Where books are prepared somewhat under the cognizance of the Commission on Text-books, would it not be possible to induce the writers to add a glossary of the terms which they themselves use? In some primary books in the classics, for instance, at the back of the volume we find a glossary of the words that are used. Especially in the case of books in which dental terms largely predominate and which are not found in medical dictionaries at all, it occurred to me that possibly under the suggestion of this Commission the authors or publishers might be induced to add, at a very slight additional cost, a glossary which would be invaluable to the student.

Dr. Hillyer: That is a very good idea.

ORAL HYGIENE AND THE DENTAL CURRICULUM.

DR. N. S. HOFF.

Our conception of the meaning of the term Oral Hygiene has grown from the earliest records of literature to the present day, when it assumes a degree of importance that is drawing the medical and dental practitioners of the healing arts

into closer co-operation than ever before. It is also furnishing a reason for classifying the practice of dentistry as a department or specialty of general medicine, which for years we have tried to sustain by force of logic.

That disease of the mouth and teeth was recognized in the earliest periods of civilization is made certain to us from the earliest records of the Chinese and Egyptian life. The Greek medical men, Esculapius and Hippocrates, wrote not only of diseases of the mouth and teeth, but state that there were tooth doctors in those early times. The Romans from 400 B. C. wrote of dental diseases, and prescribed prophylaxis, such as tooth powders, washes, tooth picks, etc., and they also did some creditable surgical and prosthetic treatment. The great Arabian surgeon, Abulcasis of Spain, was the first to write of dental diseases and their treatment with any definiteness. His work was more scientifically stated by Ambrose Pare in the sixteenth century, and still better by Fauchard in the eighteenth century, who classified oral diseases and devised surgical, therapeutic and operative treatments, which resulted in the establishment of dentistry as an art distinct from general surgery and medicine. It remained for the Americans in the nineteenth century to develop a system of dental education and to establish the profession. It seems probable that the twentieth century will establish better laws of health as the result of the general scientific researches by the medical and dental professions, because of the great movement of the present day for preventive methods. We have discovered that dental affections can not be viewed or treated as isolated factors, but must be thought of as important parts of the whole system. It therefore makes it necessary for us when we attempt to discuss the subject of Oral Health, to consider it not only in detail but in its larger bearing on general bodily health.

A definition of Oral Hygiene in the large must necessarily include a comprehensive consideration not only of Oral Pathology and its treatment, but of the relations which these diseases bear to the body functions in general; it also must refer back to the formative periods, for preventive influence, in order that we may more effectively utilize every influence possible for Oral Health. We are discovering that oral diseases are intimately responsible for systemic diseases as well as the

fact long since suspected that systemic diseases induce oral affections. With this premise understood and accepted, we become conscious of the complicated task before us of devising a system of instruction that shall be properly balanced and adequate to impart the necessary instruction to our students with our present limitations in the way of time and facilities. It will be the endeavor of this paper to present the subject in its pedagogic relations, at least as we see them, for your consideration, with the hope that a full discussion will result in some well directed effort toward the solution of this important and difficult problem. It is our purpose to present some of the chief factors and then a tentative curriculum that may serve the purpose of directing the discussion into a more practical and concrete form. Since no comprehensive consideration of this subject can be made disassociated from almost every clinical subject in the dental curriculum, it was obviously not the wish of your program committee that the subject should be thus presented, else they would have allotted us more time and excluded all the rest of the exercises. We take it that we are asked to present some workable scheme that may be put into the present course of study that will help to gather together under one chair all the essential factors that are correlated, with the idea of emphasizing their importance as bearing on this one phenomenon of dental health, leaving the discussion of how these results are to be attained, in detail, to the several chairs where their technique is more fully developed.

Because the subject is so comprehensive and there is no text published which adequately covers the subject, we see no other way of presenting the material to students than by a course of lectures, supplemented by clinical demonstrations and practice. There will no doubt be considerable variation in your notions as to the contents of the course and your methods of presentation, but undoubtedly all will recognize the necessity for a systematic course of instruction that shall embody our present knowledge of the subject and some measure of consistency in presenting it to our classes.

The object we have tried to keep in view in the presentation of this outline is that pertinent teachings by the several chairs, on the subject of Oral Health, as for instance, by the Scientific and Clinical instructors, may be presented more forcibly in this review, because of their definite application. Our idea be-

ing, that the whole curriculum will be, as it were, vitalized, and correlated with all other pertinent subjects. It is our hope that students will begin to understand why certain subjects in the curriculum, which are difficult, and hard for them to maintain an interest in, are so tenaciously kept there by the Faculty. In passing, it will be said that it may be thought necessary to make considerable mention or review of every technical subject taught; but of course we cannot do that in the time at our disposal, even though it might seem advantageous. What we can do, is to present the fundamental principles involved, which are essential to an intelligent conception of the subject, involving as it may, some consideration of most treatments in dental practice. Even such consideration may seem to add materially to our already over burdened curriculum. But in our judgment this subject is of vital importance and unconsciously all our clinical teachers are compelled to, and do, spend much of their time on the prophylaxis aspect of their special subjects. Some of this time and labor could be saved, and the other subjects be more forcibly taught, if the clinical teachers knew that this subject was to be carefully presented by a special instructor.

The importance of this subject, and its proper relations to all other subjects of the curriculum, will be more effectively presented in a proper course of lectures, and a deeper impression will be made on the student's attitude to the work. At any rate, the subject is so important that time for its proper presentation seems one of the absolute necessities, and some way of providing adequately for it, is one of our present administration concerns. All our clinical studies are accumulating knowledge and skill, and are continually demanding more time at the expense of the fundamental studies, and it seems almost necessary to add another year to our course of instruction soon, or still further curtail the scientific instruction, if we are to keep up with the continually increasing demands made by this development in our art departments. The suggestion is made that we employ better teachers and learn to condense instruction: but experience teaches us that the ability of instructors and methods of instruction, scarcely do more than to keep pace with the increase in the advancement of the sciences and arts of our profession. It seems to take about so much time for the average student to assimilate a course of preparation for practice, just as the fighting people of our times find it requires a

certain amount of time and training to make a modern soldier out of a raw recruit. It seems also that we must have more time to make modern dentists; and in the meantime we shall have to do what we can, by increasing our facilities and the quality of the instruction by every possible means, to provide time and opportunities for this course. Our notion is that we must do some careful studying of the problem of Oral Hygiene before we can put into practice an ideal, or even a satisfactory course of instruction, because we have found that the attempt to introduce Oral Prophylaxis in the clinic, has by increasing technical ideals, called for more time, for the teaching of these subjects. With these facts in mind, we have tried to place this matter before you in as comprehensive and concrete form as possible for better consideration as to its contents and the method of administration. I have purposely eliminated the strictly medical aspect of the subject as it complicates not only the contents of the curriculum, but its administration. I have tried to bring it within the compass of the present curriculum, and to make it sufficiently elemental, that the average student may assimilate it, and yet that it may under competent instructors, supply the incentive for a course of unlimited research and the greatest expansion. I submit for your consideration, the following schedule, which I will briefly explain that you may at least get my thought as to the contents of the course, and my notion of its pedagogic consistency.

ORAL HYGIENE CURRICULUM.

LECTURES

1. Pre-natal development of jaws and teeth, Embryologic-Physiologic.
2. Causes of Mal-development, preventive treatment.
3. Eruption of the Deciduous Teeth, Physiologic, Pathologic.
4. Oral Prophylaxis for Children, Professional, Personal.
5. Orthodontia for the Deciduous Teeth.
6. Development and eruption of the Permanent Teeth, Anatomy, etc.
7. Prophylaxis for the Permanent dentition. Professional, Personal. Value of the Teeth.
8. Pathology of Second dentition. The period of change from first to second dentition.
9. Orthodontic Interference.
10. Operative Interference.

11. Care during the Stress Period of Puberty.
12. Oral Secretions and Deposits on the teeth.
13. Care during the Period of Adolescence.
14. Importance of Anatomical Restoration.
15. Treatment of Infected Dentine and Pulps.
16. Treatment of abscessed teeth and the sequellae.
17. Care of the Mother's teeth during Pregnancy.
18. Prophylaxis during the Menopause.
19. Prophylaxis for Peridental diseases, differential diagnosis.
20. Surgical treatment of Peridentitis.
21. Therapeutic Treatment of Peridentitis.
22. Special treatments of Peridentitis.
23. Oral manifestations of Systemic Diseases.
24. The influence of Oral Diseases on body health.
25. Pathologic influence of Dentures, Crowns, Bridges, etc.
26. Sterilization, ways and means, influence on prevention.
27. Personal Hygiene of the Dentist.
28. Public Instruction in Oral Hygiene.

Clinical Instruction

1. Lecture on Instruments and care.
2. Demonstration on Instrumentation.
3. Practice on Typodont and Extracted teeth.
4. Clinical Demonstration on Differential Diagnosis, Physiologic vs. Pathologic.
5. Clinical Practice, students upon each other.
6. Clinical practice on patients.

I have made a plan for 28 didactic lectures which could be given one each week, for a year, or two each week for a semester, or otherwise, as each school should find it most expedient. I have not been able to decide in which year the course should be given. There are many reasons why it should be given in the Junior year, and yet there are some factors which make it more pertinent to the Senior year. It might be given during the first semester of the Senior year as a compromise. In our school, it would seem the second semester of the Junior year would be the proper time, or a part might be given to the Juniors, to be completed to the Seniors. A discussion of the matter involves so many points, that must be adjusted by individual schools, that I hesitate to raise it here, as it may detract from what I

consider the more important matter, the consideration of the course as to its contents. I trust you will not tire of my detailed explanation of the course, as I can think of no better way of giving you my ideas.

In the first lecture the idea is to give a careful presentation of the jaws and teeth, and as to their development in the prenatal period; to be followed by the second lecture on common forms of maldevelopment, such as cleft palate, imperfect teeth, misplaced teeth, etc., and the means used to secure normal development; such as diet, exercise, and health of mothers during the period of gestation and child birth.

In the third lecture, the feeding of babies with reference to the development of well formed teeth, in normal arches, and the phenomena of erupting deciduous teeth.

There is a great deal of literature of a miscellaneous kind on this group of subjects, but none of our text books present it in concise terms or in such form that it is readily available to students. Some statistics and illustrative material is already available, and much more important data will be secured when the subject is investigated more, as it will be when many teachers go earnestly about studying this problem for teaching it, as has resulted to other branches when they started teaching them.

The fourth topic, Prophylaxis for Children, is a large and highly important one, and there is no lack of illustrative material in our literature and text books; besides every teacher of experience will have a considerable supply of illustrative material accumulated in his own experience. In this particular field there seems to lie our most hopeful opportunity for future preventive dentistry. If we can save the children's teeth intact during their normal life, we have made the greatest step toward normal permanent dentition.

The fifth lecture may seem unnecessary in view of the fact that the chair of Orthodontia lays so much stress on the fact that normal deciduous arches have so important a bearing on the early development of the bones of the face and the normal arrangement of the permanent dentition. It should receive strong emphasis from the standpoint of Oral Hygiene, as it goes without saying scarcely, that typically formed teeth in their proper places have much to do with the normal function

of all the oral tissues and organs, to say nothing of their influence on the bone and tissue development of the head and face. It is a large topic, but can be sufficintly emphasized in a single lecture that is carefully worked out.

6. The development and eruption of the permanent dentition will of course be well presented by the instructors in Dental Anatomy and Orthodontia, but they will need to be again re-stated and emphasized in their relations to oral health. Perfectly developed teeth, in regular arches, have a tremendous influence in normal functions, and in respect to the health of the entire body, their value can hardly be overstated. There should be here presented an opportunity to contrast briefly the difference between good healthy development, supplying an efficient masticating function, and the converse as is too often witnessed, where mal-occlusion precludes anything like normal mastication, with results all too evident.

7. Prophylaxis for permanent dentition makes almost too large a subject for one lecture, as it should include a restatement of the changes taking place in the jaws and face bones, and their influence on the nervous system. The feeding of the child and care of his health during this climacteric period, when the demands of nature begin to assert themselves with greater force, and the functions become more complicated, all require special attention. The care of the teeth themselves at this time, is highly important, a strict regime of prophylaxis is essential to the establishment of a competent personal mouth toilet. The 6th, 7th, 8th, 9th, and 10th lectures form a group that can hardly be considered separately, although I have tried to separate them for convenience in presentation. The details of instrumental prophylaxis, I have referred to the clinical presentation of the subject, where it can be done with more detail.

8. The Pathology of the period of change from first to second dentition is highly important and most significant. There are many abnormal conditions possible and some of them may be detrimental to health. Malpositions of the teeth because of premature extractions, delayed development of second teeth, caries, and exposed pulps interfering with proper food mastication, abscessed teeth, necrosis, and other affections of the soft tissues, which interfere with proper development of the jaws, and poison the system. This period is full of interest and needs careful professional supervision.

9. The Ninth lecture on Orthodontic interference at this period is needed to emphasize the value of general Orthodontic treatment, particularly in its health relations during this period, where it is most important in preventive values, and because it is the period when it is most easily accomplished.

10. The Tenth lecture on operative interference needs little comment, since its importance is already so well recognized and this treatment is so customary that patients themselves are on the lookout for its necessity. The necessity for early and frequent inspections at this time, that incipient infections may be discovered and remedied promptly as preventive measures, is not so well known as is necessary, and students should have this matter strongly put before them. It is at this point that the value of all forms of preventive treatment should be impressed upon the patient, Orthodontic, Prophylactic, Therapeutic, and Operative treatments, as may be needed. In fact, a thorough regime of Oral Prophylaxis should be developed at this time.

11. The Eleventh lecture is on a subject to which too little attention has been given by the profession. It is a period in the life of girls in particular, of tremendous importance. In it, the oral secretions are likely to be seriously affected, owing to the nervous strain incident to the changes of this period. It is a period of the realization of new power in both sexes and leads sometimes to excesses to the point of disregard for consequences, or to the development of physical weaknesses that may react unfortunately on the oral tissues. The strong get reckless and abandon self, while the weak get morbid and neglect ordinary habits of sanitation. It is usually the period of excess and nowhere is its influence more definitely shown than in the mouth. It is a time for rigid prophylaxis and frequent inspection.

11 and 12. This period and immediately following, is the one in which the teeth decay most noticeably. It is the time when deposits occur most constantly of the soft or adhesive character and sometimes the hard deposits. The soft deposits are of mucoid character with extraneous substances, the natural consequence of neglect. It is the period of caries in the proximal surfaces. Just why the teeth decay more at this period than almost any other has not yet been made clear to us; but

there is need at this time for renewed efforts in diagnosing incipient caries and pathologic changes in the gum tissues.

13. Care during the period of youth is so evident that it seems unnecessary to make comment. It is the period of maturing physically and mentally, and when the period of childhood and puberty have been successfully passed, the chances are that it will be safely passed, barring unusual accidents. The healthy boy develops to manhood as naturally as any other animal and his love for good food and his tendency to all kinds of out door exercises insure good health and proper dental development. But the boy or girl who has had a struggle to keep healthy, finds the same continued in the maturing period, and too often permanent impairments of the vital tissues of the body handicap and influence nutrition from mastication to elimination. It is vital that the teeth and oral functions in such patients should have the best of care and that rigid mouth sanitation should be insisted upon.

14. The adult period brings with it the beginning of repairs. Caries during this period is the great foe to health of the mouth, as of the body. Teeth decay and lose their normal form, they are even wholly lost, and need repairs. It is this gradual loss of cusp efficiency, snug proximal contacts, and of entire tooth crowns that impairs the masticating function and by neglect or misuse that disease of the peridental tissue is encouraged, and a new kind of prophylaxis treatment is demanded. The preventive treatment is restoration to the normal, that normal function may be resumed. It is here that normal contacts and occlusal restoration should be emphasized in fillings and crown and bridge restoration for health's sake.

15. The conservative treatment of caries from sensitive dentine to pulp infection is another important item, not only for conservation of the individual teeth, but for the health of the entire mouth. Aside from the discomfort of exposed and irritable dentine, positive pathologic disturbances are excited, such as localized neuralgia from irritated pulps, calcic deposits in the pulp, and actual devitalization, followed by apical infection with a long train of distressing complications. Prevention of alveolar abscesses by sanitary root canal treatment and the unhygienic consequences of indifferent treatment is an illustration pertinent to this lecture.

16. It is hardly necessary to more than mention the long train of pathologic consequences of infected and devitalized pulps and their influence on oral health, as well as their more remote influence on general health through systemic infection. Here is a great field for discussion and for emphasizing the preventive treatment and the highest type of curative treatment. Apical and pericemental abscesses and their sequellae will supply an abundance of illustrative material.

17. Too little attention is given by dentists to the care of the mother's teeth during the period of pregnancy. Largely because such matters are supposed to be looked after by the physician, but, as a matter of fact, it is entirely within the province of the dentist to advise and protect patients dentally at such times, and it should be the special duty of the dentist to advise his patients as to the proper care of their teeth at such times.

18. Another occasion for dental instruction and close supervision is at the climacteric period in every woman's life, the period of the menopause. When the changes are taking place that mean a complete readjustment of life's habits and phenomena. It is a period of nervous restlessness, and the oral secretions as well as the digestive functions are likely to be seriously affected. It also marks the beginning of the degenerative processes in the peridental structure which leads to serious pathologic infection. It is a time for close observation and careful prophylaxis.

19. Prophylaxis treatment of tooth surfaces to rescue the peridental tissues from pathologic infection, from deposits on the root surfaces. Here the most careful and discriminating diagnosis is demanded that the proper treatment may be administered. Ability to differentiate the several varieties of pathologic affections is essential and this will require an extended experience, unless it can be clearly shown by the instructor. The methods of treatment should be deferred to the clinical lecture where it can be best shown to small sections in actual demonstrations. It can be described, or illustrated by slides and charts, or by showing patients, and by all such means.

20. The most effective treatment for peridental disease of long standing, or where the hard as well as the soft tissues are involved, is undoubtedly the surgical. The theory should be

clearly outlined and enough of the operative shown to impress the student with some surgical method that shall at least serve to convey the principles of surgical thoroughness and aseptic methods. A simple and effective technique of instrumentation with a clear statement of the object to be attained will quicken interest and impress the student.

21. It will be asking too much to present in a single lecture, all the therapeutic measures and remedies used in the treatment of these conditions. A discussion of the comparative merits with such data as will enable the student to determine when and how to use the important classes of therapeutic agents to advantage is necessary. The remedies used in this treatment can be readily classified and their functions briefly explained in a single lecture.

22. Special treatments should be given such emphasis as their respective merits seem to justify. These agencies are generally more effective in the hands of persons who are enthusiastic advocates and use them to the exclusion of other agents. Their efficiency depends to such an extent on the skill and personality of the individual who advocates them that they are not successful in the hands of the average practitioner. Bacterial vaccines, the employment of specific emetin, forced absorption of disinfecting drugs, etc., will serve to illustrate this form of treatment. A discussion of these agents will help to start students to thinking properly about such treatments and to discriminate as to their values and uses.

23. An important lecture should be addressed to the symptoms that appear in the mucosa of the mouth as a result of systemic infection. Not that the dental student should be made familiar with such diseases and be expected to treat them, but very often these manifestations may have an important bearing on his efforts to treat local conditions. The oral sanitarian for instance, would make slight headway in treating a syphilitic ulcer by local applications, and ignoring its significance in dental constructive operations, might lead to serious consequences. Diabetic affections often show themselves in peridental inflammatory infections which may be mistaken for gingivitis, and surgical treatment may result in serious systemic infections. Dyspepsia, catarrh, asthma, erysipelas, and many other skin affections need to be recognized and given proper care.

24. The influence of oral diseases on bodily health is just beginning to attract serious attention from physicians and dentists and there is opening up a large field of important consideration here by the dentist. The influence of abscessed teeth, pyorrhetic teeth, and other pus producing affections supply sufficient sources of systemic infection to account for many of the chronic affections, such as Arthritis, etc. The entire subject of bad dentistry and its effect on mastication and nutrition will furnish an abundance of materal for emphasizing the necessity of good dentistry for the sake of better health.

25. The importance of rigid artificial supports, made on hygienic principles, to maintain normal occlusion and supply missing teeth, and that are capable of being kept wholesome and sanitary, needs to be well considered. The dental profession has been more criticized by medical men for unsanitary crown and bridge work than for any other practice, because much of it is so faulty in design and construction as to become a serious menace to general health. There is not time in a single lecture to present the hygiene of the subject, but the main facts should be reviewed and emphasized from the standpoint of both oral and general health, calling particular attention to the harm done by careless dentistry in this department. The pathologic influence of dentures, while perhaps not so serious as bad crowns and bridges, is still of great importance. The pernicious influence of wearing poorly adapted dentures, or those made of improper material, or of wearing a denture for too long a time, are all unhygienic practices that the average dental practitioner does not realize with sufficient force to cause him to give much needed advice to his patients. Many patients are wearing dentures that not only are badly adapted, but are exceedingly unsanitary, and they are not disturbed by this fact because they have become so accustomed to wearing them that they have adapted themselves to their dentures and are wholly unconscious of the fact that they are a menace to their health. This needs correction.

26. Sterilization is so much emphasized in all departments and yet so badly practiced in this most important connection that it seems necessary to further consider it. It is the basis of all sanitation and any course in hygiene that did not discuss it and make it fundamental would be faulty indeed. Sterilization of the mouth and its importance as a prophylactic measure is

peculiarly indicated. The proper means and methods for this purpose can be impressed by a carefully worked out lecture, adapted to this subject.

27. Personal hygiene for the dentist needs special treatment. We have in mind a lecture on personal health, extending even to personal toilet, which shall make the dentist's contact with patients agreeable, and free from possible harm. This involves personal habits, office surroundings, and everything that makes for cleanliness in all professional relations.

28. Public instruction in Oral Hygiene perhaps can be best placed before students' minds in an illustrative lecture. It should be impressed upon the student as an important professional function of his to the people, which he is bound to respect. The fundamentals should be clearly shown and various methods of presenting them to the public made plain. As all men can not do public work as speakers before an audience, they can, if so minded, make demonstrations and give of their time and skill for the public welfare. They will usually find a way of their own, if impressed with the necessity for so doing. They can be helped by practical suggestions.

This explanation, while tedious perhaps, will better enable you, I trust, to comprehend my viewpoint, and I hope enable you to give me further help in making the course more perfect and practicable. The most serious fault I have with it is that we have no text book which the student can use to make his own thinking more active and effective. On the other hand, it appeals to me because it permits every teacher to put into it his own individuality which after all, is one of the greatest factors in good teaching. An unwise or faulty premise, often serves to bring out by critical inspection, the better methods and the truth, and I trust you may feel free to criticize radically, if you see fit, any or all of these suggestions.

For the clinical course, I would suggest a modified course on technics, including a study of instruments and their characteristics which adapt them to the surgical treatment. As the knowledge of instruments and their uses is so fundamental to successful peridental surgery, there should be a lecture, or several lectures in fact, on instrumentation on teeth outside of the mouth, to make clear what should be done and how it must be done to get results. This should be followed by demonstrations

on patients to a limited number of students, four students, one of whom sits as the patient, while the other three witness and participate in the instruction. I have scheduled this for three lectures, simply to classify it, but as a matter of fact, several demonstrations and considerable practice on extracted teeth, typodonts, and skulls if available, will be required before the student is permitted to undertake even the simplest cases of prophylaxis treatment.

We have found it to work out successfully in our clinic to pair off the students and have them work on each other, that they may criticize each other and develop controversial discussions that stimulate thinking and promote development. By requiring the students to present their mate's teeth in good condition by a certain time, and by a careful system of periodic inspection, very good results are secured. The chief value of this method is in the realization by the student of the difference between healthy and abnormal conditions of the mouth, and his knowledge of how it is produced. His realization of the comfort of a clean mouth is the best way of impressing its necessity in the mouth of his patient. To secure thoroughness, it will be necessary for the instructor to make frequent inspections and to repeat his demonstrations to such students as may not have been properly impressed by the first demonstration. The most difficult part of the instruction is to secure the idea of thoroughness without excessive injury or pain to the patient. This means that a delicate yet definite instrumentation must be developed which, as you all know, comes only from inherent ability and the culture of intelligently acquired experience. It seems like a big task to require, with all the other demands made on the student, but of all technical treatment, peridental surgery is the acme of refinement, and is not only helped by all other technical acquirements, but does much to create a sentiment for the exact and proper technique in all operations about the mouth; while it consumes time at the expense of other matters, it contributes to the sum total of technical skill, its proportion.

In instruction at the chair, after all, is where the final impression is made, much as it is with other fields of clinical instruction. Students must be shown cases as they pass through the clinic with an almost endless variety of conditions, not that so many cases are essential to good results, for many times a

student will become confused or go stale, because he is overdosed, but that a student's knowledge of the many varieties or stages of disease may cause him to study pathologic conditions more carefully that he may have a discriminating knowledge which will lead him to diagnose every case as carefully as he can. Discriminating diagnosis is necessary in all clinical work, and nowhere, possibly, to better purpose than in the treatment of peridental diseases. Any means that can be employed to further this matter, will be a welcome addition to the part of the instruction.

Practical experience must be demanded of every student, starting with simple cases of prophylaxis, he should be passed on to the more difficult conditions of suppurative and necrotic peridentitis. Care should be taken not to confuse the student in his clinical instruction by introducing complicated methods or means of treatment. A simple, but efficient plan of instrumentation with a comparatively simple set of instruments, will secure a quicker and better idea of the purpose of the treatment and lead to a quicker mastery of its technical methods. Neither should the student be burdened with an extensive array of drug remedies. Three or four classes of remedies, with one or two examples of each are enough to form a working treatment. As the student advances in skill and experience, he will add other remedies and more complicated instruments, and know their values, because he has had time to assimilate and make them his, intellectually, and mechanically.

The plan which we are putting into practice this year, is to have the Senior students put the mouths of the Junior classmen under prophylaxis treatment, before the Juniors take up the clinical work, which they will do during the second semester. Then the Junior students will put the Freshmen under treatment by the close of the session. Then each year, the Senior class will put the incoming Freshmen under treatment at the beginning of the session, and keep up their work upon each other, and the Juniors. We shall in this way, with the expenditure of a small amount of time, keep the whole school under treatment at all times. And by thus insisting on this work among the students, we are hoping to create a sentiment for clean mouths, if not for more perfect oral conditions of all sorts. This may be a way of increasing standards that is more potential than legislative enactments.

As we said in the beginning, the subject of Oral Hygiene is so comprehensive that we should have to discuss the entire curriculum to adequately present the subject. We have only endeavored to outline a course of practicable instruction, that shall serve to impress the idea of oral health most forcefully, and which is, it seems, the sentiment of the present spirit of professional progress is demanding in the interest of better clinical dentistry. We believe that the emphasis that has been given to the practice of Oral Prophylaxis by the profession during the past decade, has done fully as much to advance our ideals of higher standards for technical dentistry as any other discovery or invention of the same period. The more conscientiously and skillfully it is applied, the higher the ideals in respect to operative and prosthetic attainments are raised. Therefore we cannot help believing that for our own sakes, we must know more of this problem, and teach the subject more earnestly and effectively in our school. For more specific details as to methods of instruction, I know of nothing more helpful than the paper read before this body at its 16th Annual Meeting by Dr. T. B. Hartzell, and the text book on Oral Hygiene and Prophylaxis, by Robin Adair.

DISCUSSION

Dr. J. D. Patterson, Kansas City

During the last few years the whole civilized world has taken on a new lease of life and has more intelligently than in the past reached out for disease causes, and striven for more perfect physical manhood—has punctured myths and traditions, banished epidemics and endemics, and made life more worth living. It is an era of sanitation.

In this renaissance has come a supposed new role for the Doctor of Dental Surgery, which the public and public health servants did not heretofore acknowledge, or at least held in light esteem. And at last it has been found that the oral cavity is perhaps the most important focal center of infection in the whole body. Instead of being an entirely subsidiary one in the health program, it has become of primary importance.

Dr. Victor C. Vaughan, President of the American Medical Association, gives utterance to these words:

"We want the medical and dental professions to move ahead and point out the way by means of which the superman—because he is coming—can be brought into existence."

Note that he said "medical and dental professions." Let us be proud of that. But the faddy expression that a "new occasion" has arisen, and the query, "Will he rise to it?"—is beside the mark.

The "occasion" has always been present, with scores of workers in the dental field. They have been aware of the far-reaching effect of oral sepsis, and have intelligently practised in accord with that knowledge. And all that is consistently new about it is—

The coming appreciation of the importance of correct dental services in the stubborn brains of the majority of medical men and public health servants.

The oral hygiene propaganda is then not of recent birth; but let us be thankful that it has taken its rightful place in health economics.

Granted, then, the importance of the health of the oral cavity; the methods of securing and continuing aseptic mouth conditions and the best ways of teaching those methods, are of supreme importance to every Doctor of Dental Surgery, especially to those in actual contact with the training of dental students.

First it may be said that: "The health statue of the teeth and mouth depends upon the inherent systemic and local tendencies."

Second, on the shape of the teeth, their relation to each other and their self-cleansing tendencies.

Third, on the integrity of each tooth's investment.

Fourth, on proper and vigorous use of teeth in mastication.

To secure and maintain the foregoing conditions there must be:

1. Perfect occlusion of the teeth;
2. Perfect alignment of the teeth;
3. Perfect contact points;

4. Smooth margins to all fillings;
5. No ill-fitting crowns;
6. No mouth breathing;
7. Perfect systemic conditions;
8. Absence of fermentative and putrefactive processes.

I think it may be safely stated that the teacher of oral hygiene, if he covers the ways and means to fulfill the above conditions, has at least a comprehensive basis it will do well to adhere to.

After the writer had set down the foregoing briefs because he had official notice of being on the program to discuss Oral Hygiene, he received a copy of Dr. Hoff's fine address upon the subject.

The first thought after reading was that the address should have had a different title, something like, Complete System of Dentistry, for the address comes very near embracing the whole field of dental practice, and so long as our curricula give place to from 12 to 20 members of the faculty who are assigned, on account of particular fitness secured by special study, to their particular branches, I thought they should be given an opportunity, unembarassed and unduplicated, to make good in their special domain, without possible counter influence.

And again it came to mind that my long teaching experience has led me to believe that when we take raw material, and usually they are very raw, only the basic principles can be adequately grafted definitely upon the student's brain, especially so in studies apart from the practical part of operation and mechanical dentistry.

If each member of the faculty in his particular subject would go as far afield as Dr. Hoff has invited us to do in teaching "Oral Hygiene," the course in all branches of study could not, I think, be adequately covered in three or even in four or five years, and the student would be confused with a multiplicity of side chains and by duplication representing perhaps the "personal equation" of other professors.

I will endeavor to point out to you why, in my opinion, certain numbers in Dr. Hoff's schedule should be eliminated:

Lectures No. 1. Prenatal development of the jaws and teeth; embryologic—physiologic.

It certainly is not unreasonable to say that these subjects strictly belong to the chairs of Dental Anatomy, Histology, Embryology, and Physiology.

Lectures No. 2. Causes of maldevelopment; preventive treatment.

Causes of maldevelopment should, we think, come under the head of Dental Anatomy and Histology.

Lectures No. 6. Development and eruption of the permanent teeth; anatomy.

This again comes under the head of Dental Anatomy and Dental Histology.

Lectures No. 8. Pathology of second dentition.
This comes properly under the head of Dental Pathology.

Lectures No. 11. Operative interference.

The teaching for this should come from the chair of Operative Dentistry.

Lectures Nos. 15 & 16. Treatment of infected dentine and pulps and treatment of abscessed teeth and sequellae.

These operations and treatment are properly disposed of by the professors of Operative Dentistry and Dental Pathology.

Lectures No. 20. Surgical treatment of pericementitis.

This also should be under the head of dental Pathology and Operative Dentistry.

If these subjects were relegated to the chairs to which I consider they are germane, there remains an array of subjects in Professor Hoff's schedule which certainly would abundantly occupy the time which the importance of the subject demands and the time which can be allotted to it.

In all laudable enterprises in life, and dental education is one, the ultimate ends should be kept in view and the best means by which they can be secured.

In reaching this end I think it must be said that a certain amount of business ability and acumen must be employed.

In dental education and training and college teaching, to secure the best for the dentist's lifework one of the business principles should be, and I believe usually is, that—

First, Each subject or departmet should have a teacher who has especial preparedness for that particular work, that he must be possessed of all the modern and standard knowledge upon the subject; and—

Second, That he should be unimpeded in that work, and on account of limited time, confine himself to it, and—

Third, That his teaching should not be interrupted or crossed by another.

I think it must appeal to you that this is good business sense. So I must conclude that the professors of Dental Anatomy, Bacteriology, Embryology, Histology, Physiology, Surgery, and Orthodontia, who take pride in the especial work, should or would look askance upon the teacher of Oral Hygiene who, instead of referring his students to the constituted professor upon these subjects, essays to give such instruction himself.

Dr. J. D. Towner, Memphis

In the presentation of this subject, Oral Hygiene, we have for consideration a most important fundamental principle of our art and therefore one of paramount interest to this body. Serving as the principal foundation upon which all our services should be based, and offering the most substantial connecting link between medicine and dentistry, it is to be wondered why the subject has not been presented ere this. It is indeed a lamentable fact that after more than fifty years of dental teaching the true object of all our endeavors is just now receiving its merited share of consideration. Regretable as this omission seems it serves to impress the prominence of the subject, at this time, and makes its comprehensive consideration of paramount importance.

I shall not attempt either to criticize or to laud the paper of the essayist in its many details, inasmuch as such a discussion, added to the necessarily long principal discourse, would indeed preclude all other exercises. Other than compliment this body upon the good fortune of having a very important subject presented by one so eminently capable of handling it to the best advantage, I shall confine my remarks more to the

point of knowledge gained by personal experience as a teacher of this branch the past five years.

Establishing the chair of Oral Hygiene and Prophylaxis with the launching of the College of Dental Surgery, University of Memphis in 1909 and continuing it as a part of the curriculum of the College of Dentistry, University of Tennessee, after the merging of the two schools, I have been unable, to my own satisfaction at least, to give a thoroughly rounded and comprehensive course during any series of twenty-eight lectures. To give some idea of the important consideration given the subject at that time, the announcement of the chair, made in the first college bulletin, is herewith given:

ORAL HYGIENE AND PROPHYLAXIS
Professor Towner.

This course deals with the prevention of disease of those parts immediately connected with the oral cavity.

In certain cases the health of one organ is so dependent upon the manner in which all other organs of the body perform their functions, that a course of general hygiene with special reference to its influence upon the oral cavity will be given.

Theories of proven value will have their practical application in order that the student may have fixed in mind definite procedures best suited to the accomplishment of desired results.

The surgical technique of prophylaxis will be made of special importance.

As a teacher I have been unable to separate the two words Hygiene and Prophylaxis, and have therefore denominated the chair Oral Hygiene and Prophylaxis, instead of simply Oral Hygiene. I hardly see how the two, with their principles of practice, can be divorced, therefore, I favor this designation, with the possible improvement of substituting the word Mouth for Oral. As I understand it, and so try to impress the student, in Hygiene we contemplate the removal of predisposing conditions and accomplish this usually by means of sanitation, which is considered defensive, while in Prophylaxis we deal more with exciting causes by means of disinfection, which is aggressive. The following chart, part of one used in teaching the distinction between Health and Disease and impressing the importance of preventive measures in treating disease, serves to relieve the students' minds of confusion regarding the necessary distinction of meaning of the relative words and makes definite the principles of practice involved.

Preventive treatment of disease.	Hygiene	Removing Predisposing Conditions	Sanitation	Defensive
	Prophylaxis	Destroying Exciting Causes	Disinfection	Aggressive

The subject grows in importance and magnitude each year until now it seems necessary to outline a course of instruction beginning with Hygiene during the prenatal period, as it applies to expectant mother and child, and active Prophylaxis with the eruption of the first tooth, applying both to the remotest cause of Mouth Pathology. In this we have to consider not only local and systemic susceptibility to disease, but must apply the principles involved to all restorative processes within our prescribed field. The proper comprehension of the subject, then, leads to the conclusion that as a didactic, or clinical chair, or both, it must of necessity deal with every branch of the purely dental curriculum and some of the medical subjects included in the course. The occupant of this chair should be allowed ample latitude and take advantage of every opportunity to apply its teachings to all pertinent subjects. Furthermore, as the essayist suggests, each of the several chairs to which Oral Hygiene has any relation, should have the definite application made to the end that the subject may be more fully vitalized.

The chief obstacle to be surmounted, as I see it, is not one of a specified course of lectures, though a certain standardization in this respect is desirable and should be attained, but appears at present to be more that of sufficient time allotment. With a three years' course, already full and the recent developments of several branches requiring more time for their presentation, it seems difficult to take sufficient time from other work to devote to what might be properly termed a comprehensive study of Oral Hygiene and Prophylaxis. It appears that a course of this character, to be thoroughly comprehensive should be presented to all three classes somewhat in this order:

The first year student should have a didactic course calculated to impress, first of all, the elementary principles of Hygiene, its importance and absolute necessity as applied to the several pertinent subjects of this year. In this connection the lectures, Nos. 1, 2, 3, 6, 8, 15, 16, 23, 24, 26, 27, as suggested by Dr. Hoff, could readily be adapted to this purpose and serve

to bring the student, early in his professional course, face to face with facts of inestimable value. No less desirable is it to impress the importance of Moral, Personal and Professional Hygiene at this time, as we are more apt to secure the interest of the student in this very necessary aspect of the subject. A very beneficial series of lectures can be given to this class during one semester and should by all means be provided, because, if for no other reason, it is only fair to the student that he be given, in the beginning of preparation for his life work, a fair conception of true principles upon which to build.

To the second year class should be given a concise review of the more important subjects discussed before the first year men and the principles of Prophylaxis as applied to various pathological conditions and restorative processes. For this purpose the lectures, Nos. 4, 7, 11, 13, 14, 17, 18, 25, 28, as outlined in the tentative curriculum, would serve the purpose well. In this year a thorough didactic, technical and clinical course should be given. Special emphasis should be placed upon cleaning teeth for to my mind this is the most important subject in the whole realm of Prophylaxis and should be so impressed upon the student. There is no better means by which one may properly classify students and dentists than the test of cleaning teeth and I would resign the chair of Oral Hygiene and Prophylaxis before consenting to lessen the consideration due this one subject. The didactic and technique work should come during the first semester, and the clinical work kept up during the remainder of the student's college course.

The third year men should have a course in the causes, pathology, diagnosis and treatment of the various diseases of the gingivitis, peridental membrane, and alveolar process, with clinical demonstration and practice. An important part of this course would be the delicate surgical and therapeutic treatment of Pyorrhea which could be covered in the suggested lectures 19, 20, 21, 22. A review of the more important details of the principles of Prophylaxis as applied to the various mouth conditions might be desirable. The course should be closed with several lectures devoted to the management of patients, the necessity for their co-operation, importance of public instruction and the business aspect and office management.

A well directed course of lectures, technique and clinical requirements can be arranged in the form of a graded course

so the pupil may graduate from one to the other and in due time have a very complete and intelligent understanding of the subject. It seems, too, that one semester, preferably the first, devoted to the didactic instruction of each class, with ample provision for practical requirements, would be sufficient time for this work. It might be desirable, for certain reasons, to supplement the practical work of the seniors with lectures through the entire college year, but this is a matter which can be very easily arranged.

In making these suggestions no attempt is made at detail, the idea being that this is a question of more mature deliberation and prolonged discussion than is possible at this time.

However, the idea of curriculum is fairly well in mind, differing somewhat, but not essentially, from that suggested in the paper, and may be arranged to suit any time allotment.

The course as at present taught is both didactic and clinical, and is given to the second and third year classes at the same time. It comprises one lecture each week, 28 in all, including reviews, with clinical demonstrations in the Operatory one afternoon each week. In the Operatory we impress personal Hygiene, demonstrate the selection, use, and care of instruments, differential diagnosis, and clinical practice. This work is made obligatory and is carefully graded. The Operatory requirements as set forth in our Blue Book are as follows:

ORAL HYGIENE AND PROPHYLAXIS REQUIREMENTS.
Prof. J. D. Towner.

Other than the relief of pain, Prophylaxis must be the first service rendered a patient.

Students will not be assigned patients until they, themselves, have had necessary Prophylaxis treatment. At both mid-term and final examinations each student is required to present, with his paper, a credit slip, signed by the demonstrator, certifying that he has had proper prophylaxis treatment within ten days previous to date of examination.

	Points.
Prophylaxis	5 to 10 Points
Gingivitis { Marginal / Interstitial }	10 to 15 Points
Pericementitis	15 to 20 Points
Pyorrhea	20 to 25 Points

Minimum Requirements—Juniors 50 points; Seniors 150 points.

Instrument List

1 Set (12) Towner Calculi Scalers	$4.80
1 Set (12) Towner's Polishing Files	7.00
1 Knife-edge Arkansas Stone	.60
1 dozen Aluminum Handles	3.50

The didactic course as now given is somewhat in this order:

1. The meaning and true principles of Hygiene and Prophylaxis. Importance and necessity.
2. Personal and Professional Hygiene.
3. Health and Diseases—Preventive treatment.

4. 5. 6. Hygiene as Applied to Processes from Formative to Restorative.

7. 8. 9. 10. 11. 12. (7) Cleaning Teeth (Prophylaxis). (8) Preliminary Preparation.

(9). Surgical. (10) Therapeutic. (11) Instructive, (12). Co-operation of Patient.

13. Influence of Mouth Disease upon the General Economy.
14. Manifestations of Systemic Disease within the mouth.

MID-TERM EXAMINATION.

15. Stress Periods.
16. Secretions.
17. Deposits.
18. Marginal Gingivitis.
19. Interstitial Gingivitis.
20. Pericementis.
21. Pericemental Abscess.
22. Pyorrhea, Class 1.
23. Pyorrhea, Class 2.
24. Pyorrhea, Class 3.
25. Pyorrhea Treatment, general.
26. Public Instruction.
27. Economics.
28. Review.

It is evident that while the field has not been fully covered an attempt has been made to impress the importance of the subject and make its application exceedingly practical. In the course no stereotyped lectures are given, only topical notes being used, and the lecturer depends upon his clinical experience and observation and a vast amount of reading for material. During the past three years twenty-six lectures were given during one term and thirty during another, showing how it is possible to either contract or expand the course to meet circumstances. While the work outlined is by no means what it should be, being susceptible to much improvement, even under present conditions, it is more thorough than that included in

the curriculum of many schools and is given here for the purpose of not only helping where it may, but inviting constructive criticism.

It seems necessary at this time to make some provision for a more uniform and competent course of instruction in Mouth Hygiene and Prophylaxis and it is hoped that, in any deliberations looking toward this end, consideration will be given the establishment of a graded course beginning with the Freshman class and concluded at the close of the Senior year. It seems possible, crowded though the course now is, to outline a series of forty-two lectures with technical and clinical requirements, and provide time for them during at least one semester of each of the three years. As a matter of fact, actual time consumption will be less than it seems to be, upon first thought, but, be that as it may, the idea is to do justice to the student and there seems no more urgent demand in this respect than to broaden his conception of this revolutionary subject.

I am indeed glad to have had Dr. Hoff's paper brought so forcibly to my attention and to have had the privilege of taking part in the discussion. The paper is timely, full of pertinent matter presented in an unusually attractive and forceful manner. I should like to see his paper made the basis of real constructive work to the end that we will, ere long, not only have a competent course of instruction in this branch, but that a text book will be provided to aid the student and practitioner alike.

Dr. A. J. Bush, Columbus

When notified that I was expected to discuss this paper I had completed the preparation of my paper on "Crown and Bridge Work," so unintentionally I had incorporated in that paper my ideas on the importance of the subject of oral hygiene, saying that it was the fundamental principle in the teaching of crown and bridge work.

I am glad indeed that Dr. Hoff has written this paper, because I think possibly of all the papers we have had this is the most important because the most fundamental. Dr. Hoff has expressed the most comprehensive view of the scientific way of teaching dentistry that we have had for many years.

So I would be very glad to see more time allotted to this subject. It is not of so much interest to me how the subject

is taught, whether we have a special man for it or whether all of the respective chairs take it up in proportion as it touches their subjects. It has been my habit to consider it from the standpoint of crown and bridge work, and I might add from the orthodontic standpoint. But the essential thing is that it should be taken care of, and I think possibly this paper offers the most comprehensive plan for the future scientific teaching of dentistry that we have ever had offered to us. I wish to congratulate Dr. Hoff upon his effort.

Dr. R. L. Simpson, Richmond

So much valuable instruction has been given at this meeting that I feel like suggesting one little idea that seems to be original.

You know that prosthetic work is very hard on the fingers. Under our course in hygiene we have secured a middle-aged married manicurist to give this session two or three lectures and demonstrations on the care of the hands. This has proved so practical that a number of surgeons have asked that the surgical students be allowed to attend these lectures and demonstrations next year.

Dr. W. E. Willmott, Toronto

Dr. Towner's remark about having every student present a certificate that his mouth is in proper condition before he goes up to examination, reminds me that, largely through the efforts of Dr. Thornton, McGill University has a regulation that, in addition to the physical examination required of every student before registration, there be also an examination of the mouth. This shows that they are recognizing the necessity of a perfectly healthy mouth. This action included all departments of the University, not dentistry alone.

Dr. Hoff,
(Closing the Discussion)

I want to thank Dr. Patterson for letting me down so easy. I specially requested that Dr. Patterson be assigned to discuss this paper because he always "goes for me," and I knew that he had ideas that were far better than mine and that he would greatly enhance the merit of my paper by his criticism.

I want to say that in writing this paper I had no idea of taking prerogatives from any other teacher in the faculty. On

inally I took up the work of Oral Prophylaxis to satisfy myself in the first place whether it was a matter that should be taught in our school. I have been studying this subject for several years to determine whether the subject is a proper one for the dental curriculum and, if so, how it should be taught. The further I have experienced the matter the more clearly I have seen that this subject concerns practically every phase of dentistry, that every branch is closely tied up with it.

My notion is that the subject should be emphasized from a special chair in order that the whole question may be presented in a more emphatic form. Each teacher knows his duty in this matter, and I would not take anything away from him. I would not for a moment advocate that the work should be thus presented if I thought this would tend to make the teaching from other chairs any less effective along this line. Neither would I in this course advocate a technic in any operations that would not lead to general mouth sanitation. My object would be to present the subject in its relation to oral hygiene and emphasize it from that standpoint. Not that I would teach a technique differing from that presented by teachers of other subjects, but endeavor to emphasize what other teachers are advocating in this direction, emphasizing it so strongly as to make a deeper impression. My notion is to provide another means of deepening those impressions and making them more emphatic from all standpoints.

I did not suppose that anybody would be pleased with this curriculum. I simply presented it as the result of my investigation along this line and as representing my idea of what should be done. But whether or not ths is the best way to accomplish it remains to be developed in the future. It is for us to get together on this subject, for I think it is high time it be presented more thoroughly in our schools than it is today. It is a most important subject, and I say this not because I am teaching it, for another instructor is teaching it in this school, but because I find that this branch is so fundamental to the teaching of every other subject that to my mind it is one of the most essential things to be taught. We have a complicated problem on our hands, but I believe when we have time to study it more carefully we will get together on some common basis and evolve a plan that can be accepted and put into effect, leading up to a comprehensive scheme of teaching and possibly re-

sult in more complete text-books on the subject. There is little in our literature on the subject. Every little while I receive a letter from a dentist inquiring where he can get articles on this subject that will help him to develop the topic in his private practice. I can not refer him to any book or article because what has been written has all been on some particular phase of the question considered from but one particular man's standpoint.

REPORT OF MASTER OF EXHIBITS.

When I started to prepare this report, I began with an account of letters unanswered and requests disregarded, but, recalling the row of "Proceedings" of the Institute for the past few years that peacefully slumbered side by side on a shelf in the College library, I eagerly turned their pages to the reports of ex-Masters of Exhibits and spent an interesting "half hour with the old masters."

My experiences had been theirs and their discouragements touched a responsive cord in my being. They had so well presented the case that I felt on this phase of the subject I need only say "Amen," and sit down.

The solution of this problem that I would suggest is based on the assumption that man taken collectively will not assume responsibilities that would be readily shouldered and carried through by the individual. It is the same in all community life. Assign a task to a group and there is little response; choose individuals and make it a personal matter, and the work is done.

It has been suggested by Dr. W. M. Randall of the Louisville College of Dentistry that a definite program be adopted for the coming years so that the future Special Exhibits may gradually develop all the methods of teaching used. I hope Dr. Randall will have an opportunity to fully present this plan to you and that it may then be acted upon. I would suggest that to insure its success, certain schools be selected and their acceptance received for the Special Exhibit for next year. They would then feel individual responsibility, know at once of what the Exhibit is to consist and have a year in which to prepare it.

The following figures briefly show the results of our efforts:

Of the forty-seven schools on our list, nineteen promised exhibits, thirteen for the Special Operative Technic work, twelve for the general exhibit. Seven sent no answer whatever, four of this number being on the list of those who made no response to last year's request.

The actual display as you have studied it in the Exhibit room consists of Special Operative Technic Exhibits from:

1. Northwestern University Dental School.
2. Louisville College of Dentistry.
3. University of Michigan, College of Dental Surgery.
4. Ohio College of Dental Surgery.
5. University of Buffalo, Dental Department.
6. Philadelphia Dental College.
7. New York College of Dentistry.
8. St. Louis Dental College.
9. Ohio State University, College of Dentistry.
10. University of Pittsburgh, School of Dentistry.
11. Georgetown University, Dental Department.
12. Lincoln Dental College, University of Nebraska.
13. Laval University, Dental Department.
14. University of Tennessee, College of Dentistry.
15. North Pacific College of Dentistry.
16. Colorado College of Dental Surgery.

Exhibits in other lines from:

1. Northwestern University Dental School.
2. Louisville College of Dentistry.
3. Royal College of Dental Surgeons.
4. University of Michigan, College of Dental Surgery.
5. Ohio College of Dental Surgery.
6. University of Buffalo, Dental Department.
7. Philadelphia Dental College.
8. Ohio State University, College of Dentistry.
9. University of Pittsburgh, School of Dentistry.
10. New York College of Dentistry.
11. Georgetown University, Dental Department.
12. Laval University, Dental Department.
13. North Pacific College of Dentistry.
14. Indiana Dental College.

I had planned to have printed a small folder containing information descriptive of the General Exhibit, but especially

giving interesting details descriptive of the Special Operative Technic display. It was to augment the work shown in somewhat the same way as does a descriptive catalogue in an Art or Historical Museum.

That results were not what I had hoped for was undoubtedly due to my inability to clearly convey my idea. The few replies received were almost entirely confined to answers to the few questions I had sent. These were only samples of the many facts I wished to receive. If the suggested plan for future Special Exhibits is adopted, this idea of a descriptive folder could be better developed, especially if the subjects chosen were those that the Master of Exhibits and his associates were actively engaged in teaching, for they could then prepare a sufficiently long list of questions to adequately cover the subjects and not have to depend on gaining facts not specifically asked for.

The far-reaching effect of the vast European conflagration was shown in some of the replies from the Northern colleges. They told of the partial or complete suspension of many regular lines of endeavor in response to calls of assistance from their Mother Country.

In closing, I gratefully acknowledge the encouragement received from some of the schools in their replies to my communications. It is these notes of personal interest and hearty assistance that warm the heart with a sense of gratitude and stimulate to renewed effort.

Respectfully submitted,
E. S. Packwood.

REPORT OF COMMITTEE ON DR. WILLIAMS' PAPER.

DR. ELLISON HILLYER, BROOKLYN.

I will take just a few moments to report what has been done. It was necessary to bring the cumulation of our individual work to the conference of the members of the committee in attendance here, before any action could really be taken.

At the time Dr. Williams gave his paper last year we found that it was not exactly in the condition it should be in for publication in the proceedings. Dr. Williams took the paper in

order to complete it and in the further compiling of the work we found that it was larger than we could insert in the proceedings as a whole. Therefore, the suggestion was made to, and adopted by, the Executive Board to permit Dr. Williams to present to the colleges and to the members of the committee the paper with context bearing upon the subject, in order that they might collaborate during the year. This was done and all the colleges have received the publication, which is called "A New Classification of Natural and Artificial Teeth," covering the entire subject. This has also been in the hands of the committee.

The committee appointed for this particular work was named by the President, as follows: Drs. I. N. Broomell, C. J. Grieves, H. W. Morgan, H. E. Friesell, J. H. Prothero, G. H. Wilson, W. C. Davis, A. W. Thornton, Wm. Bebb and E. Hillyer.

In order to make fairly reasonable calculations, I devised a card that would afford an opportunity for a clinical investigation, to cover any kind of case, either of student or patient, private or infirmary, so that we might be able to get as far as possible a really definite amount of data upon which to base some kind of inference. This tabulation list covers the class of face according to the types 1, 2, or 3, with the modification, if present. Then the size of the face in the length and the width, the width being taken at the widest part. The characteristics of face: that is, the color of the eyes, the color of the hair, the complexion, whether light or dark.

Then, in reference to the tooth, we considered the class according to the type 1, 2, and 3, and the modification if present; the length and width of the incisor was then measured and the color and indication of the shade guide used.

I sent this card to the members of the committee and received response from several and co-operation as far as possible from quite a number, more particularly from Dr. Davis of Lincoln, Neb., and Dr. Wilson, an honorary member of the Institute, resident in Cleveland.

What disposition you will make of this matter will probably depend somewhat upon the discussion of today, for I think that comparatively little in the way of definite conclusion will be arrived at at this session. The subject has been presented

to the Institute in every phase from the beginning. Dr. Williams read the preliminary paper at the meeting over which I presided in Toronto; last year the second stage was presented to you in mature form and now I am going to recommend that the added matter that has developed during the year, and which is confirmatory of the work presented last year, shall be given to us by Dr. Williams in brief form in order that we may have before the Institute the full data to date.

I said that I did not think it would be possible to arrive at a definite conclusion at this session. We shall probably express our opinions and we shall have to go back, every one of us to the principles underlying this work; we shall have to study this matter more and reach our conclusions, applying them as we feel they should be applied. Then this tabulation will, I believe, be of great value in the establishing of one thing, at least: The appropriate size of a tooth to a given size and type of face, so that at some future date we shall be able to say that with a size of face restored according to the contour and having the measurements as we feel we wish to have them reproduced, we will determine the proper size, carried out in the teeth. We know that if the results of the investigation are correct they will be guided according to the preconceived ideas of harmony, at least.

FURTHER CONSIDERATION ON THE RELATION OF TOOTH FORM TO FACIAL CONTOUR

BY J. LEON WILLIAMS, D. D. S., L. D. S.

In the short paper which I have prepared for this occasion I shall present some further evidence confirming the views laid before you last year at Buffalo with reference to the relation of tooth form to facial contour. You will, I am sure, all admit that it is highly desirable to establish a basis for this relation upon which we can all agree and it is also important that any rule formulated for finding this relation should be so clear and simple that it may be quickly grasped and easily applied by the student in dental prothesis.

There is but one absolutely exact science—mathematics. Chemistry is, in this respect, a near relative of mathematics. All of the other sciences contain more or less of the elements of uncertainty. They are built up by the slow accumulation of facts and the demonstration of the relation between those facts. This is the scientific method, the work of reason. But there is another manifestation of human activity that is quite as important as science. We call it *art* and its field or function is to express the entire range of human feeling or emotion. Science and art are associated more or less completely in all human effort, but in analyzing human work the mistake is very frequently made of confusing the two. In what I have to say today about the fundamental principles of the Trubyte system of artificial teeth and selection of these teeth for any given face, I shall try to keep the distinction between science and art clearly in view.

The Trubyte system is founded on the discovery of three fundamental forms of human teeth and that discovery is a scientific fact attested by the highest scientific authority in the world. The relation of these three forms to different human faces lies in the field of art, and while the exhibition of this relation is by no means entirely a matter of feeling, it is not capable of mathematcal demonstration. Nor would this be necessary if nature had given us any uniform rule in the matter which we might follow. In my presentation of this subject before you last year, I brought forward the most overwhelming evidence, in photographs of skulls, that the mistakes or disharmonies of nature are so frequent that there is no infallible guide here. During the past year, considerable work has been

done in pursuing this line of research on living people. Between two and three hundred photographs and models have already been secured, and this work will be continued until sufficient material is in hand for an exhaustive consideration of the whole subject. At the present time, I can say that the evidence from living people is in complete harmony with the facts brought before you a year ago. The effect of the crossing of types is to combine, or bring into juxtaposition, in the offspring features from the parents which are markedly different and often inharmonious. It is these facts of heredity which have completely destroyed the temperamental theory and made difficult the shaping of a satisfactory rule for tooth selection. I think, therefore, that you will be interested in a brief consideration of some of these facts. In the paper which I read last year at Buffalo, I called your attention to the works of well-known scientific authorities, notably, Mendel, Galton, DeVries, Bateson and Thomson, which deal more or less exhaustively with these problems of heredity. Almost nothing has been done in this field in the investigation of the laws of inheritance as applied specifically to human teeth. The utmost that I can do today is to call your attention to the *probable* cause of those disharmonies which I have already pointed out and to lay further evidence of the facts before you. It is now perfectly well known that there are two distinct ways in which the qualities and characters of parents are transmitted to offspring. In the one case, there appears a more or less complete blending of the character of both parents. In the other, certain characters from each parent appear clear, distinct and ununited in the offspring. Both of these aspects of inheritance may come under what is known as Mendel's law. Johann Gregor Mendel, Abbe of Brunn, in Bohemia, experimented extensively in the crossing of plants. His most important work was published in 1866, but was entirely unnoticed by the scientific world. It was discovered forty years later almost simultaneously by three scientific workers, but Hugo deVries, the celebrated Dutch Botanist, was foremost in calling attention to the great importance of Mendel's researches.

The work of these two men, Mendel and deVries, has profoundly modified the Darwinian view of transmission and inheritance. I can get before you such fundamental facts as we wish to hold in mind at the present moment by the use of two or threeillustrations of Mendel's work. He began his experiments by

crossing different varieties of the edible garden pea. He tested this plant for some seven or eight different characters, tallness and shortness of stem, color of stems and pods, color of the skin and the body of the pea, smoothness or wrinkledness of the body of the pea, and several other qualities. When he crossed the tall with the dwarf pea, he found the offspring of the first generation were always all tall, but the offspring of this hybrid always presented one dwarf to three tall plants. The 25% of dwarfs always breed true to dwarfness. Of the others, 25% breed true to tallness, and the remaining 50% are hybrids like the hybrid from the first generation, and this result holds with almost mathematical exactness for all succeeding generations in all Mendelian qualities that have been thoroughly investigated. When two unlike Mendelian characters are crossed, only one appears in the first generation and this one is called the "dominant." The other is known as the "recessive," and the recessive always appears in the second generation in the proportion of one to three. It is believed that this effect is brought about by the complete aggregation in the germ cell of the definite material from which the particular character is developed. Mendel's law, as stated by Lock, is as follows: The gametes of a heterozygote bear the pure parental, allelomorphs completely separated from one another, and the numerical distribution of the separate allelomorphs in the gatmetes is such that all possible combinations of them are present in approximately equal numbers.* But Lock further says that the dominance of one number of a pair of differentiating characters which distinguished all of Mendel's experiments "is by no means a universal phenomenon when different varieties of plants are crossed together. In a considerable number of instances, the heterozygote (hybrid) is found to exhibit an appearance which is more or less intermediate between the types of character shown by the parents. It may be almost exactly intermediate, or the appearance of the cross-bred form *may be nearer to that of one parent than to that of the other.*" This latter part of Lock's statement agrees perfectly with what I have said in former papers about the prevailing dominance of type in faces and teeth. Now let us examine a few illustrations in which several Mendelian characters will appear. The view on the screen is taken from a colored photograph from nature, showing the results of a Mendelian experiment in color. The yellow peas shown on the right at the top were crossed with the green variety on the

left. The hybrids from this cross were all yellow, as shown by the specimen group three. This result is invariable. Yellow is therefore, said to be dominant, and green recessive. If we plant the three hybrid yellow peas, the offspring of the second generation appear as shown in the pods of the plant below. Here you see eleven yellow and four green peas, as close an approximation of one green to three yellow as you can get in fifteen seeds.

In our next view we have shown the play of two pairs of Mendelian characters—yellowness and greenness, and smoothness and wrinkledness. The yellow wrinkled pea being crossed with the green round pea, the hybrids are all yellow and smooth. Yellowness and smoothness are, therefore, dominant to greenness and wrinkledness. In the offspring of the hybrids shown in the pods of the plant, we again have the dominants and recessive exhibited. We have smooth yellow and smooth green and wrinkled yellow and wrinkled green, and all the seeds in any given plant will show the ratio of one recessive to three dominants. One-fourth of this second generation will usually breed true to the dominant quality, one-fourth to the recessive quality, and the remaining half will prove hybrids like this second generation, and this rule holds for all succeeding generations. Similar results follow the crossing of smooth yellow and wrinkled white maise. Many new and important varieties of food plants have been obtained by Mendelian crossing notable among these being a new, heavy yielding variety of wheat which is free from liability to rust. We see by these experiments that not only is external character transmitted with almost mathematical exactness, but what may be properly called internal quality is inherited in the same manner. The smooth grains in both maise and peas have a preponderance of starch which, in the wrinkled variety, is largely replaced by sugar and water. It is the evaporation of the water that gives the wrinkled appearance. Many Mendelian experiments have been made with animals, but I shall not have time to show you but a single one of these.

The view on the screen shows you the result of crossing a white albino with a Japanese waltzing mouse which is also white, with patches of yellow. Both of these varieties of mice are very tame. The hybrid resulting from the crossing of these

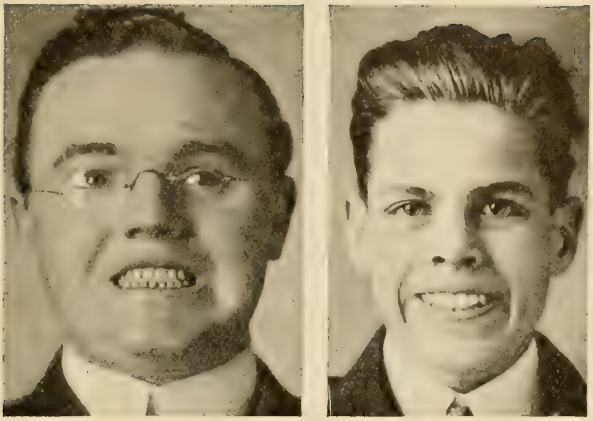
white mice is brown in color and has all the character of a wild mouse. It is believed that the white mice were originally bred from the brown, wild variety and that this is a case of reversion. But if the brown hybrid is crossed with its kind, we have a return to the colors of the original parents with various intermediate blendings according to the Mendelian law. Up to the present, but comparatively little research work has been done along Mendelian lines on human beings. The generations are so far apart that such work is slow and difficult. But it has been found that the color of hair and the color of the iris of the eye follows Mendel's law of inheritance. Now we know that the teeth and the hair arise from the same embryonal layer and it is at least a reasonable presumption that the same law of inheritance obtains in both. If Mendel's law of inheritance can be traced in the teeth, it would explain our greatest difficulty in the effort to obtain a perfectly satisfactory basis or standard for the harmonizing of tooth form with the other features and especially with facial outline. That difficulty arises in the fact that we find many instances of marked disproportion between teeth and face in both size and shape. In former papers, I have called your attention to the proof of these disharmonies as seen in a comparative exhibition of skulls. Out of a great mass of material which I have accumulated during the past year, I will now show you a few further illustrations of this important fact in photographs from living people.

There is a striking difference in these two faces, but the teeth in the smaller and narrower face are about the same size as those in the larger and broader face.

Here again the smaller face has very large, coarse teeth.

In this photograph we have a contrast in the size of the teeth that almost shocks us. This might and probably does, come about by the inheritance of distinct, unmodified parental characters, a small and refined type of face might be inherited from one parent and large teeth from the other. This does not necessarily imply that these particular characters constitute a Mendelian pair.

The contrast is even more marked in these two male faces where the small, narrow face has teeth much larger than those seen in the larger face.



You will, I am sure, agree that we can rest our case with evidence now on the screen. There is an ancient Eastern proverb which says: "The hunchback of the fool causes no remark, but we talk a good deal about the pimple on a wise man's face." The human mind seems naturally to demand the fitness of relation or harmony in all things and when we see the contrary we begin questioning. We set about trying to find out the causes of nature's mistakes in the hope of remedying them. In our efforts to find a basis for common agreement as to the harmonious relation of tooth form to face, let me bring the problem before you in the simplest form in which it can be stated. Given, a long, narrow face with parallel sides you would not select short broad teeth for such a case, or, given a short, broad face, you would not select a long, narrow tooth, to replace the natural ones. It is a matter of common knowledge and experience that short, broad teeth are more suitable for a short, broad face than long, narrow teeth would be. Very well, then what I have been trying to accomplish is a refinement and an extension of that common knowledge and experience so that we may secure a better adaptation of tooth form to those faces in which the relation of tooth to face is not quite so obvious at first glance as it is in the straight, long and broad faces. If we select a few well marked types of faces, say ten or a dozen, we shall find that nearly all human faces easily fall into one or other of those groups and also that all the faces in those groups can be seen to be modifications of three primary forms—the

square, the tapering and the ovoid. The examination of a large number of sets of natural teeth show us that in a majority of instances there is an approximation to harmony of relation between tooth form and face form. The majority of people with faces the sides of which are parallel will have teeth the proximal sides of which are more or less tapering. People who have faces the lower half of which is full and round, will have central incisors with more or less rounded distal proximal surfaces. These are facts of nature which any one may observe for himself. Shall we not, then, take our stand on the facts of nature and try to eliminate the faults and disharmonies and refine and perfect the harmonious relation?

We all know that the ancient Greeks reached a higher degree of perfection in modeling the ideal human face than has ever been accomplished by any other people at any other time. They divided the length of the human face into three equal parts, the first division being from the chin to the base of the nose, the second representing the length of the nose, and the third the height of the forehead from the root of the nose. Very few modern faces conform to this classical standard. The distances from the base of the nose to the central point of the chin will usually be found considerably greater than the length of the nose. In my efforts to find a fairly constant basis for a rule for harmonizing tooth form with facial size and contour, I hit upon the idea of taking the two lower divisions of the face, according to the Greek system of measurement, and considering them as one. Dividing this distance by two, gave me the position which the base of the nose *should* occupy, although that is of no importance for our present purpose. By measuring the length of a great number of upper incisors in the mouths of living people whose teeth presented a fine harmony with the face, I found that if the upper central incisor were enlarged to the width of the face and the inverted outline of this enlarged tooth placed over the face, after the manner first described by Berry, it corresponded very closely with the outlines of the face *and the incisal edge of the inverted tooth reached a point covering two-thirds of the upper section of the Greek division* of the face. This latter feature is, as far as I know, new and gives

an exact standard for length of tooth. I will show you with what surprising accuracy this correspondence of relation works out. Six sets of teeth were selected from our collection of photographs which we agreed represented the most harmonious and perfect relationship between tooth form and facial contour.

Outline drawings of the *ideal* tooth for each face according to the rule mentioned were then made. The next step was to enlarge one of the central incisors from each face up to the exact width of the face taken at the point just below the eyes. You have on the screen a photograph of the six faces selected with the measurements in millimeters of the *ideal tooth* drawn for each face *and the natural incisor* in that same face. The close correspondence of those measurements, in two instances less than a millimeter in photographs one-third natural size, shows that we have here a surprisingly accurate basis for our work. In the view now on the screen, you see in the top row the upper central incisors of the three faces shown in the upper row just on the screen, enlarged to the length of our standard for that particular face. In the lower row are represented drawings of the ideal tooth for each face as worked out by our rule. The very close approximation and the slight differences are both instructive. You will observe that the lower row of centrals which are drawn from our rule for ideal measurement, are slightly narrower than the corresponding natural teeth. This is undoubtedly an advantage for all except certain special cases. A careful examination of the natural upper centrals in the mouths of two or three hundred people will convince any dentist that in a majority of the cases it would not be practicable to insert artificial teeth quite as large as the natural ones. In some of the instances which I have shown you and in others which you will see on the screen, it is quite obvious that the

78.
68.82

79.
66.87

centrals are too large for perfect harmony with the face. On the other hand, the use of artificial teeth too small for the

face is a fault that is far too frequently found. I shall refer to this point again a little later. The proof of the value of our rule is quite as evident in cases of disharmony as in those I have just shown. In this face on the right in which we have agreed that the natural teeth are too large, our rule gives a difference of over 12 m. m. between the ideal and the actual size. I believe the highest attainable degree of perfection in the harmony of tooth form to face is reached when the outline of the central incisors follows closely the outline of the face and when the width and length of the tooth is exactly in proportion to the

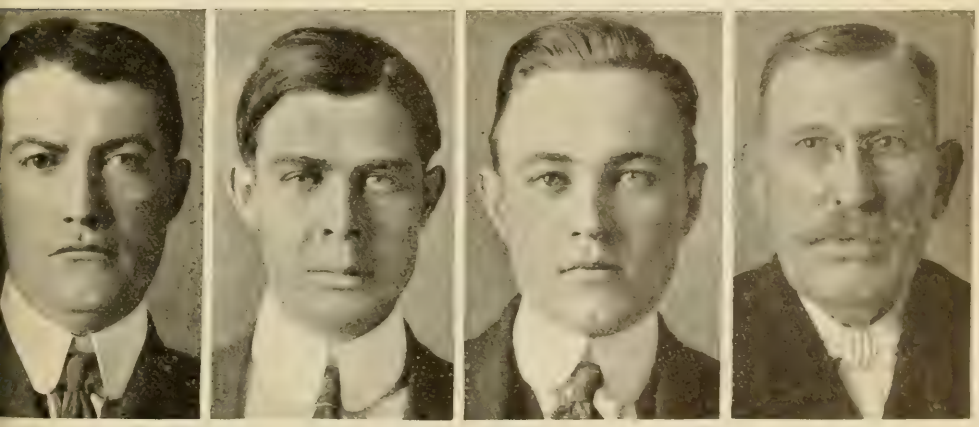
width of the face and its length from the chin to a point about two-thirds the height of the forehead. When we say of any one "that person has a beautiful set of teeth" we are paying instinctive homage to this relationship of form, for harmony of relation is the most fundamental thing in beauty. Our instinctive judgment is undoubtedly based on both relation of size and relation of form.

Some logician has very cleverly said that the strongest possible proof of the soundness of any proposition is the impossibility of imagining the contrary. If any one still feels disposed to question the esthetic soundness of the rule I have presented, I will ask him to keep in mind all the facts and try to imagine some other principle for his guidance.

The indisputable facts to be kept in mind are that there are three typal forms of teeth, the square, the tapering and the ovoid with many intermediate modifications; that there are also a few distinct forms of faces, the square, the tapering and the round or ovoid, with many intermediate modifications, and that *in a majority of instances* we find the form of the natural teeth corresponding more or less closely with the form of the face. If you would not select a long tooth for a long face, a short tooth for a short face, a tapering tooth for a tapering face and an oval tooth for an oval face, what would you do? Any other rule would not only be a departure from nature but would not give harmonious results. Our rule, you see, *is based on the facts of nature* and we have simply attempted to correct the mistakes of nature and to perfect the relationship between tooth and face by founding our procedure on the old Greek classic for the most perfect proportion of the human face.

The leading investigators in the field of anthropology and ethnology are agreed that all human heads and faces can be referred to a few standard or typal groups. A recent writer on the subject who has given ten years to measuring and comparing human heads and faces in almost every country in the world claims that there are only sixteen definite combinations of types. I have not myself fixed upon a definite limiting number of distinct forms of faces but the chart of the Trubtye system of artificial teeth which I prepared nearly two years ago provides for twenty-one variations of the three typal forms, seven in each class with from four to seven sizes in each form. I think it doubtful if a greater number of molds are ever required. It is certain that the number provided for covers a far wider range of shape than all the other forms of artificial teeth in existence. Let us look at a few of the leading groups of faces for which these moulds have been designed.

You see in this view a group of square faces of medium or short-medium length. There are slight variations but the sides of all the faces are very nearly parallel. Here is another group of the same class with the outlines of the ideal tooth forms superimposed on the faces. A single mould,with the variation in size, is equally suitable for all faces of that class. Here is a group of longer faces the sides of which are nearly parallel.



This and the three following slides presents variations of the long and short tapering faces. And in this view we have two variations of tapering face with the outline of the ideal tooth form of these faces. This and the following views will bring clearly before you the striking contrast in size and form between the teeth required for these faces.

The next slides show the face which I call the ovoid type. Its chief characteristic is that its greatest width is below the eyes. In the most marked form of this class the whole lower part of the face is much heavier in appearance than the upper part.

The working drawings for some of the teeth of this class are shown in this view but none of these have yet been supplied to the dealers. This entire class will soon be ready. These three types of faces to which I have called your attention correspond perfectly with the classification known as motive, mental and vital, which, by the way, has no relation to the temperamental theory. In the Trubtye system of the teeth are presented, for the first time, forms which are perfectly harmonious with these three types and their modifications.

And now I will show you a few sets of beautiful natural teeth that are perfectly harmonious with the faces in which they appear and at the same time I will call your attention to a condition which should always slightly modify the selection of teeth with reference to size. Size of features, especially large size of mouth and thickness of lips, demand a larger tooth than a small mouth and more refined features without reference to size of face.

In the view on the screen the face on the left is much stronger and heavier, particularly about the mouth, than the one on the right. The medium sized tooth required by the one on the right would be too small for the one on the left. A small

tooth in a face with a large mouth is so inharmonious as to be positively ridiculous.

Here is a fine strong face, well balanced in all its features, a rather large mouth, large nose and large eyes. You see the central incisors are large also, possibly a little too large for the most pleasing effect. In this view we have a rather heavy

form of the oval face with thick lips. The central incisors, you observe, are large and oval-shaped and perfectly in harmony with the face.

Here we have a more refined face with smaller mouth and smaller teeth. This photograph presents a short broad face with teeth of corresponding proportions which go perfectly with the face. One of the modifications of the tapering form of face with teeth to match. Two faces of which the lower one is coarse and square with teeth that are perfectly harmonious in each face. Notice especially the more refined form of the lateral in the upper face. The substitution of a narrow lateral with rounded corners for a broad, square form is quite sufficient to give a refined and feminine aspect to a set of teeth.

As soon as this work of photographing living faces is completed the results will be published in convenient form for professional use. It seems to me that a work containing a large number of faces of different types showing the natural teeth as they appear i nthose faces, together with photographs of the teeth enlarged up to natural size, thus showing the exact natural arrangements of natural teeth in all typal forms of faces, will be of great practical vcalue to the prosthodontist.

From all that I have heard during my attendance of several meetings of this association I am convinced that the one great element of success with students is to get them genuiinely interested in their work. That is why I think so highly of Dr. Nolin's preparatory work in this department of dental teching. He gets his students thoroughly imbued with the general principles involved in all art work. When they come to the definic. He gets his students thoroughly imbued with the general those general principles to the work in hand. This gives them such a deep interest in work that is considered monotonous and

akin to drudgery by those who are ignorant of the art principles involved that I should expect such students to reach a much higher degree of proficiency than those who look upon their work as drudgery. Exactly the same principles are involved in the use of the new forms of teeth which I am producing. I think the mere handling and examination of these teeth should be a great stimulus to higher achievement in every other phase of the work.

Gentlemen, in conclusion, I wish to return my most cordial thanks for the assistance you have given me in my efforts to secure these greatly needed improvements in artificial teeth. By your sympathetic support, by the resolution which you passed three years ago and now, during the past year, by the time which some of your leading members have given to the investigation of certain phases of the subject, you have helped on the important work of placing prosthetic dentistry on new and higher ground. It must be gratifying to all of you, as it is to me, to know that from this time forward this branch of professional practice pursues an upward course. My attitude now, as it has been since I started this work, is that of one who happens to be so situated that he can carry into effect the will of the most advanced and progressive men in the profession as far as the production of artificial teeth are concerned.

I have spent the larger part of eight years and a great deal of my own personal savings and income in investigation, study and experiment. The results of this work have from time to time been submitted to the profession for criticism or approval. No important step in this work has been undertaken without consulting my professional confreres. We have, I think, been very fortunate in securing the liberal and hearty co-operation of one of the largest and most progressive firms in the world engaged in the manufacture of artificial teeth. You have seen what it is possible to do as a first step. The desire of the profession for the continuance of this work and the loyalty of its support will be the exact measure of whatever may be accomplished in the future. And there is very much to be done if the finest possible results are to be realized. The opportunity is before us for realizing our highest ideals in the production of every form of porcelain teeth. Concerted action in giving expression to your wishes and your ideals is all that is necessary to that realization.

DISCUSSION.

Dr. H. E. Friesell, Pittsburgh

I have not very much discussion to offer on the subject of Dr. Hillyer's report or upon the magnificent work Dr. Williams has done. You can all see for yourselves; you have all heard what has been done. Perhaps some of us have a little conception of the immense amount of work represented here, the expense involved, and the many other factors peculiar to a work that is so large and that covers such a vast field, and which means so much to us in that particular branch of the profession in the future that an ordinary discussion can hardly break the ice. It is something we must take home with us and use in our practice, when we will be able to study it out. There is no question but the work Dr. Williams has done and is still doing and bringing to perfection, will change our whole field of prosthetic dentistry, making it, instead of an unscientific, hit-or-miss mechanical operaton, a scientific, artistic side of our work.

There are others here better prepared to discuss this matter from the prosthetic standpoint than am I, but from the artistic standpoint we can appreciate the immense amount of work that has been done. From a personal knowledge of the large amount of time and money that Dr. Williams has put into this investigation, I want to express admiration for the effort that has been expended, and to announce my determination to assist in the work in every way I possibly can.

Dr. A. W. Thornton, Montreal

In regard to Dr. Williams' presentation of this subject, I want to say that we as teachers appreciate something of the great value this work will be to us, and when completed it also will be of advantage to the general practitioner.

We have been discussing teaching methods and teaching appliances, but as I have thought of Dr. Williams' work one fact growing out of it has appealed to me very strongly: Men sent out from our schools are efficient or inefficient not because of the appliances we have at our disposal or the men who do the teaching, but because of the natural bent of the man himself or the inspiration which he has received from the school or from some outside source. So I think it would be well to keep in mind that men are good or bad in the profession not because

of the school, but sometimes in spite of the school and in spite of the teaching.

Dr. N. S. Hoff, Ann Arbor

It is a remarkable thing that a man of Dr. Williams' caliber should see fit to go out of his way, and drop work for which he is so eminently fitted as a scientific man, and give his time and attention to so common a thing as porcelain teeth, in an effort to give us something better than we have ever had before. We are inclined to be entirely satisfied with what Dr. Williams has produced for us. In talking with Dr. Williams I find that he is not yet through with the work, but that what he has done is only preliminary, and he is planning to give us a still more artistic and practical product of his skill. He is giving all his time and energy and a great deal of his money, and making other great personal sacrifices, simply for the love of his profession, and because he feels that in this particular field he has an opportunity to do something for our profession. Therefore, I personally feel very grateful to him for what he has already done, and I know that in the days to come the profession generally will feel more and more grateful to Dr. Williams for the results of his untiring labors. Perhaps if not remembered for anything else after leaving us, he will then be remembered for his work in this direction, because it is going to grow until bye and bye we shall value Dr. Williams for what he has, as a professional man, done for us. I want to encourage him. He has stated in his address that whether he should be able to go on and do what he sees ought to be done, will depend upon us; upon whether we endorse this thing, upon whether we encourage him sufficiently in the work.

Personally, I feel most grateful and satisfied with what Dr. Williams has done in the way of making these tooth forms for us. But I know as he also says that there is a great deal more that should be done in the way of improving the colors. I am not satisfied withthe colors of these teeth. And with my own personal efforts I am seeking to encourage him in the solving of the color problem, for he tells me that this is a difficult matter, and one that will take time and years to accomplish.

Can not we as an organization give some endorsement that will encourage him—at least express our thanks and gratitude publicly for what he has already done, and give him a boost to stimulate him to go on and do more for us? He is the only man who has ever undertaken to do this work, and the only man

ever likely to do it efficiently. If we do not take advantage of the opportunity we have now, we shall, I fear, lose out in this matter, greatly to our disadvantage. Therefore, I would present the following resolution for your consideration:

RESOLVED, That the work which is being done by Dr. J. Leon Williams in the effort to secure improved forms of artificial teeth meets with the hearty approval of the American Institute of Dental Teachers, and we recommend that this work be continued until all forms of artificial teeth are produced in the best manner known to the art.

Dr. E. Hillyer, Brooklyn

As a member of the committee and its chairman, I would like to know what disposition you wish to make of the report at this time. Are we to be dismissed simply placing the report in your hands, asking that you all take an interest in this matter, or shall the committee go on? As chairman of the committee, I do not feel satisfied. As stated in the report, we have as yet reached no definite conclusions.

It seems to me that the best disposition we could make of this accumulation of models at least would be to present them with our compliments to Dr. Williams for his disposal as he sees fit. Personally, I am sufficiently interested to go on still farther with this same tabulation, because I am not yet satisfied with the results that I have obtained so far as the students' work is concerned. I would like to have the matter so arranged that we would get these tabulations from every patient and there is where it is going to be of the greatest advantage. Each student could record the tabulation with five minutes' work. The impression in modelling compound is very quickly obtained, and after that it is only a matter of making a cast and attaching it to the card, when we have a valuable asset. I think it would be perfectly feasible to send samples of these investigation cards to every school that desires to take up the work. I think it would be a valuable adjunct to the work that we are trying to carry forward if we could get that co-operation. I make this suggestion for you to act upon as you desire.

Dr. G. H. Wilson, Cleveland

In regard to the work that we have had from Dr. Williams, I feel that it is most valuable to us. It serves to show us again that our profession is something more than mechanical dentistry. And I think we should cease call-

ing anything connected with prosthetic dentistry, mechanical. There is mechanics connected with it, but so is there with the work of an artist, or of the violinist who produces beautiful music. Would we think for a single moment that the musician could give a prescription to somebody for the purpose of reproducing his work? The mechanical part is simply the expression of the art that is within him. So it is with us: We must construct the teeth in order to express the art that is within us. That is not mechanics.

In regard to the measuring of the face. We had a very crude instrument presented to us, but this is elementary and we have not had anything to go by. It seems to me that we should adopt some standard method—the position at which we take the measurement and how we should proceed to get it. Instead of inches, I think we should use a scientific scale upon which are centimeters and millimeters.

Then for the teeth it seems to me we should measure much closer than in millimeters. With the Boley gauge we can get the exact measurement. To prepare this for our work the edges should be filed off until they have practically a sharp edge so we can get as close to the teeth as possible.

Now we have the necessary instruments, where shall we take the measurements? I think Dr. Williams should give us a definite idea of this. I dare say different men have different ideas on this point. We have been told that the widest part of the face very often corresponds to the zygomatic process, and I think Dr. Williams will tell us that this varies very materially indeed and is not a safe rule to use as a point of measurement. In regard to some of these things, I think Dr. Williams should give us specific instructions if we are to accomplish much in this line of work.

I know we are short of time, so I shall not go on farther. I feel that Dr. Williams is doing wonderful work for us and is helping to establish prosthetic dentistry upon a basis that is not mechanical.

Dr. H. E. Friesell, Pittsburgh

The suggestions of Dr. Hillyer in regard to Dr. Williams' paper are excellent, as are also those offered by Dr. Hoff. I do not know what arrangement could be advised, or whether any action is desired by Dr. Williams. But

it seems to me that here is a field of work of as much importance to the dental profession as is the work which the National Dental Association is trying to accomplish through its Bureau of Scientific Research, and that this Bureau ought to be willing to assist in this work just so far as that assistance is desired by Dr. Williams.

Dr. Williams,
(Closing the Discussion)

In regard to Dr. Hillyer's suggestion, I would be very glad to co-operate with him in drawing up a new syllabus. I would be extremely grateful for any co-operation in the work, but would especially like to co-operate with Dr. Hillyer in the drawing up of a new syllabus if it be decided by this Institute to go on with the work on behalf of the profession.

I return my warmest thanks for the cordial way in which you have received my presentation.

REPORT OF COMMISSION ON OPERATIVE TECHNICS.

Our committee after two years of work has arrived at the conclusion that it will never be possible to arrange a syllabus in this subject which will exactly please every school in every detail, unless some schools are willing to make a very small concession for the sake of benefitting the entire Institute. Each man teaching this subject has his own individuality, which must be a factor in determining the amount of work required in certain principles, but it need not hinder him from submitting to the minimum requirement in each kind of work. No restriction is made on the amount any school wishes to teach nor the way they wish to teach it, but we surely hope this Institute, at this time, will see fit to seriously consider the stating of the minimum amount, which must be taught. The time is most opportune for such an action and the replies from the majority of the schools indicate that they are heartily in favor of such action.

In submitting this syllabus to the Institute, let me state that it has been submitted to every school previously, to get the attitude of the members as far as possible toward the plan and toward this as a syllabus for adoption. Of 42 of the 47 schools replying to my letters, 38 were unconditionally in favor of the plan, two with certain conditions, and two opposed.

Again 27 schools have expressed their willingness to adopt this syllabus in every requirement. Of the remaining 15 schools, two only are not in favor of this syllabus, except in some detail, which could easily be overcome by a very small concession. The making of instruments is practically the only thing upon which there seems to be much discussion and this could be dropped from the course, unless some minimum as suggested is adopted by all and lived up to. Can we afford to give our men a set of one hundred or more instruments without teaching him why instruments are made as they are and for what purpose they are to be used? We have made the requirement exceedingly low in this work and have made allowance for either teaching the principle of instrument-making or the principle of acquainting the student with the angles, blades and cutting edges that he may know how and where to use them.

SYLLABUS—OPERATIVE TECHNICS—MINIMUM REQUIREMENTS.
Hours for the entire course: Lecture 32, Quiz 16, laboratory 160.

DENTAL ANATOMY.

1. Drawings of surface of teeth—12 Drawings.

2. Carvings.
   - *Ivory, Bone, Celluloid — Required Carvings — 4 teeth forms of either material carved to duplicate natural teeth.
   - Plaster, Modeling Compound, French Chalk — Optional Carvings.

3. Sections of Teeth for pulp canal study.
   - Longitudinal — At least one of each class of teeth
   - Transverse — Incisors, Bicuspids, Cuspids, Molars

OPERATIVE TECHNICS.

4. Instruments.
   - Classification
   - Principles of forming blades
   - Cutting edge and angle

   Either one required — Brass—12 Instruments, or Steel — 6 Instruments

5. Technic Pulp Treatment.
   1. Devitalization
   2. Anesthetization
   3. Dead pulp treatment
   4. Canal root filing

   — one each

6. Cavity Preparation
   - *Ivory, Bone, Celluloid — 12 cavities in either material

7.	Fillings	
	Gold	2
	Amalgam	6
	Cement	2
	Gutta Percha	2
		12

*Material Recommended.

The commission recommends that the Institute take a definite action in regard to this report in order that some progress may be made in this work. We feel that no school will be hampered in any way or its standard lowered by adopting a minimum requirement and we feel sure that much benefit will be derived by such action.

Respectfully submitted,

W. H. O. McGehee,
J. S. Ashbrook,
Edgar D. Coolidge, Chairman.

DISCUSSION.

Dr. A. W. Thornton, Montreal

So far as this outline in technic work is concerned, I have only this criticism to offer: When the request came to me to look over the syllabus which had been marked out, I took decided objection to one feature and I am still of the same opinion, and that is that the time spent in teaching the students instrument-making is an absolute waste of time. Of course, I am open to conviction on this matter, but I would just like to see the man that could convince me! That practice will not be carried out in any school in which I have any say in regard to the curriculum to be followed, until I see the matter in a different light.

Dr. H. M. Semans, Columbus

We must remember that we are not a legislative body; we are an association of teachers to deliberate upon methods of teaching. And not being a legislative body, it would, of course, not be possible for us to pass upon any action which would have to do with the policy of the various institutions from which we come. That belongs to the National Association of Dental Faculties, as I understand the situation. However, I believe that we could recommend a syllabus such

as presented in Dr. Coolidge's report. We might, for instance, recommend the scheme that he presents—that the amount of work listed in the department of operative technics be adopted as a minimum requirement. I do not know how else that motion could be put, inasmuch as the Institute is not a legislative body.

There is also one point which I would like to bring out. In fillings, it is recommended that there be two in gold, six in amalgam, six in cement, and two in gutta percha. I confess I am partial to tin. I find that the manipulative qualities of tin and the ability to place it in the cavity, are of great benefit to the student. Of course, the use of gold is very beneficial, and perhaps owing to the fact that tin is not used much in the practice of dentistry the use of gold in the technic would be preferable in some schools.

As to the making of instruments, we know that this is a much mooted question, one that we have been shying at for the last few years.

Some of us recognize the fact that the making of instruments will give the student a certain understanding of, and familiarity with, the reforming of instruments that he might have in his possession for certain purposes. As to the making of instruments to be put to use on the part of the student himself, he would, I am sure, have a decidedly inferior article. But there may be some training in finger dexterity in the making of instruments, therefore, we have adopted that part of the dental technic at our institution.

Dr. H. R. Raper, Indianapolis

Regarding the matter of making instruments, I agree with Dr. Thornton in this respect, at least, a student learns very little from the making of instruments. Therefore, the first thing the student does when he comes to our college is to make instruments. There are a few days when he does not know what he is doing or why he is doing it, and we use this time making instruments.

I think we are justified in adopting this report, because it is such a definite thing, a minimum. However, I recognize that what Dr. Semans says is true, that this is not an executive body. I move that this organization simply recommend this minimum requirement for operative technics.

Dr. A. E. Webster, Toronto

I would ask if the chairman has considered the minimum requirement it has in 1, 2 or 3 in the technic work? Has Dr. Coolidge included porcelain inlay work, has he put in cast inlay work? I do not know why these are left out.

So far as instrument-making is concerned, I agree with the speakers on that subject.

The question of the number of lectures comes in. When the teaching of Dental Pathology has arrived at a point where students are not able to know whether it is going to be a lecture or a demonstration or a clinic, when the same man that delivers the lectures does the demonstrating, then I think that there will be no discussion as to whether there will be 32 or 33 lectures. For my part I do not understand why any school should have a lecture given on any particular subject for the first time, and then the next day or the next year give the practical demonstration, and at a later term have the students do the exercise. A lecture may be ten minutes or an hour, depending upon the progress of the student. The report acknowledges the fact that some of these subjects should be taught by way of lectures on the rostrum by a person altogether different from the man who looks after the lantern.

Dr.W.H.O.McGehee, Cincinnati

As a member of the commission, there are certain phases of the report I would like to discuss. With reference to Dr. Webster's criticism in regard to leaving inlay work out of the list of requirements, I would say we are trying to get down to a definite basis for our report, confining it exclusively to an operative technic course, as it is usually understood. In most of the schools, cast inlay and porcelain inlay work are taught from an entirely different chair than that which teaches operative technics proper. That being the case, we did not think it advisable to go into the question of inlay work and possibly some other branches of operative work.

In regard to our report, what we are trying to do is to recommend a minimum requirement, which may be adopted in all schools, members of this Institute. We have no objection to any member of the Institute going beyond our proposed minimum requirement. We do think, however, that the very latest minimum requirement which we are trying to establish can be

easily adopted and carried out by every school.

I want to compliment Dr. Coolidge on the excellent work which he is doing as chairman of this commission. The fact is, he is doing practically all of it. At the same time Dr. Ashbrook and myself are enthusiastic about it and try to help Dr. Coolidge in every way we can.

The suggestion that this is not a legislative body is true. At the same time I see no reason that a recommendation can not be made by this body that every member adopt this minimum requirement. I am sure that many schools give much beyond the requirement which we are trying to establish. It is not our desire to interfere in any manner with the individuality of any teacher of this subject. We are simply trying to get down to a definite working basis.

In the report which has been presented by the chairman of the Prosthetic Technics Commission, Dr. Willmott stated that his commission also is trying to get down to a definite basis. I do not know that any action has been taken on his report. I feel sure, however, that the chairman of that commission is just as anxious to have action taken on his report as we are in regard to ours.

I do not like to criticise the report of the Commission on Prosthetic Technics, but it seems to me that the minimum requirement, which the chairman of that commission is trying to have established, is entirely too indefinite. His recommendaton is that certain principles be made a minimum requirement in prosthetic technics, not stating definitely how many pieces shall be adopted to include those principles which he is trying to cover. Our report has been made along an entirely different line, stating a definite number of pieces each school shall take up.

In regard to tin fillings, we do tin fillings in the school which I represent. The commission has absolutely no objection to any school doing tin fillings, and it is the same with inlay work.

We think, as a commission, that the making of instruments is extremely important and that it should be included in every school. We had difficulty in coming to a decision in regard to our recommendation with reference to instruments, for this reason: Those schools which are teaching instrument-making are teaching it from two different standpoints. Certain

schools are teaching the making of instruments with this idea in view: That it is necessary, before the student begins operating in the clinic, that he have a definite knowledge in regard to the angles in the shank and that he may apply that knowledge in the selection of an instrument for each individual operation he performs. Those schools which are working along that line are making their instruments out of some easily workable material, such as brass; they are not, in other words, working with any idea of giving the student technic. They are simply trying to teach him something about the Black system of instrument measurements.

Those schools which are using steel for the making of instruments are working along an entirely different line. With them technic is paramount. They are trying to teach the student something about the qualities of steel, how to anneal it, how to harden it, how to temper it, and in the making of the instruments those processes are carried out. In the finishing of the instrument, the student is taught also how to put the proper bevel on the blade, in order that he may know how to sharpen the blade of an instrument.

That being the case, we could not come to a definite decision as to whether all schools should adopt the rule of making instruments in steel or in brass. In the recommendation which we have made, we leave the matter entirely to the discretion of each individual school. You can make them in brass if you wish; you can make them in steel if you wish, or in both.

I am sure Dr. Coolidge, in closing the discussion, will bring out many phases of the subject which I have not touched upon.

Dr. W. E. Willmott, Toronto

Dr. McGehee has referred to the report presented by the Commission on Prosthetic Technics, saying that we did not definitely indicate how many pieces should be adopted. To my mind, the number of principles which can be adapted to prosthetic restoration is very much greater than that in operative technics, and therefore a minimum requirement may be arrived at much more quickly in operative technics. And if any school in this Institute does not teach more than this report recommends, then the communities in which their graduates practice must have our sympathy.

To revert to prosthetic technics, my idea was to, if possible, have the members of the Institute, not simply adopt the report, but agree upon certain principles, and then next year the com-

mission might be able to adapt those principles to specific cases and present a schedule of the minimum number of pieces in which all these principles might be exemplified. I think that is what the commission will endeavor to do for next year. We could not do it this year.

Dr. N. S. Hoff, Ann Arbor

Just a word in regard to this report, as there seems to be a general criticism in the matter of teaching instrument-making. If Dr. Thornton is not teaching instrument technique in his school, he is missing one of the greatest opportunities for cultivating handcraft at his disposal. Were he to teach the work as we do here, he would find I am sure that it is one of the most valuable technical processes in the whole range of technical instruction.

Dr. H. E. Friesell, Pittsburgh

With regard to this report, I would say that the school with which I am connected was, I believe, one of the schools that replied to the chairman of the commission that at the present time we did not believe especially in the value of the making of instruments. Our objection to that plan was due not to any feeling that there is not much of value in instrument technic, but to the fact that the limitations under the present three-year course do not incline us to believe that we are using the time required in this technic to the best advantage. Under a four-year course, with additional time at our disposal, I would be in favor of taking up instrument technic for the purpose of giving students the benefit of learning the terms connected with an instrument, the edge and bevel and what these have to do with the instrument; the efficiency, the size, the balance and leverage of the instrument, are all things the student should know if there is time to give them. Knowledge of the properties of steel is valuable as well.

I would not want to take up simply the making of instruments in brass. We might make some in brass and some in steel, but, of course, the minimum requirement gives each teacher liberty to do as he pleases.

Another point, and the same criticism was made the other day; Dr. Semans calls attention to the fact that we are a teaching and not a legislative body, and that, therefore we have no right to tell the trustees of a school what will be done in the dental school. When dental teachers begin to realize that the

faculty of a dental school ought to have some say in the running of the school, it will be much the better for dental education. And if I were a teacher in a school the dean of which was not inclined to consider a recommendation made by the faculty, I would not stay in that school long. It seems to me any sensible dean would be glad to have recommendations from his faculty for improvement in the teaching methods in any department of the school.

Dr. Coolidge,
(Closing the Discussion)

I am very grateful for the discussion of the report and for the attitude which has been taken. I requested that those who have not taken part in the discussion should do so. I knew Dr. Thornton's attitude and I wanted him to express himself before the Institute. I thought I knew the attitude of some of the other men, but not so well as that of Dr. Thornton, because he expressed his view very clearly in his letter to me just about as he stated it here, and I was anxious to have it brought out in the discussion. I feel very grateful to those who are in favor of the recommendations which have been made and who spoke words of encouragement.

I have had splendid help from my associates on the commission. We have worked very hard trying to draw up some plan that might be adopted by all without in any way interfering with any school. We thought that we had the subject in such shape this year that it could be brought up in tangible form and presented, and I am much pleased with the reception it has had. If the Institute sees fit to make any recommendation it would be a further step in what we have so far accomplished. Each year as we pass over a thing, very little is accomplished unless accepted or rejected so that the next year the committee may know what it has to begin with. If such a recommendation may be made, either voted down or adopted, no matter whether accepted or rejected, a definite action will be of great assistance in future efforts along this line of work.

APPENDIX.

CONSTITUTION AND BY-LAWS.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

FORMERLY

INSTITUTE OF DENTAL PEDAGOGICS.

Organized at The World's Columbian Dental Congress, Chicago, 1893.

REVISED CONSTITUTION AND BY-LAWS.

ARTICLE I.

Name and Object.

Section 1. This association shall be known as the "American Institute of Dental Teachers."

SEC. 2. Its object shall be the improvement of the educational department of the colleges comprising its membership, by interchange of thought and formulation of methods.

ARTICLE II.

OFFICERS AND STANDING COMMITTEE.

SECTION 1. The officers shall be a President, Vice-President and Secretary-Treasurer, the same to be selected from the active members and elected by a majority ballot at the annual meeting.

SEC. 2. There shall be one standing committee of three members, which shall be known as the Executive Board, the same to be elected by a majority ballot at the annual meeting.

SEC. 3. The Executive Board shall be elected and serve as follows: At each annual meeting there shall be one member elected to serve for three years.

ARTICLE III.

MEETINGS AND QUORUM.

SECTION 1. The regular meeting shall be held at such time and place as may be decided upon by the Executive Board.

SEC. 2. On the written application of the representatives of seven colleges the President may, on thirty days' notice, call special meetings to be held at such places as may be most convenient.

SEC. 3. Representatives from ten colleges shall constitute a quorum.

ARTICLE IV.

MEMBERS AND DUES.

SECTION 1. Any college in the United States or Canada which complies fully with all the requirements of the National Association of Dental Faculties as regards educational standards, is eligible to apply for membership in this body.

SEC. 2. Active members shall consist of accredited representatives from the teaching staff of the colleges holding membership.

SEC. 3. Each college holding membership in this body may be represented by one or more of its teaching staff as its representatives, and such representatives shall be entitled to all the privileges of the Institute, *except that no college shall cast more than one vote on any matter acted on by the Institute.*

SEC. 4. Any teacher having been an accredited delegate to this body for three or more years from a school in good standing, may, in the event of withdrawing from the faculty, of such school, be made a permanent member —without vote—by a two-thirds affirmative vote of the members present.

SEC. 5. The annual dues shall be twenty dollars ($20.00) from each college, payable in advance. *The dues of a college must be paid before its representative can take part in the proceedings of the Institute.*

ARTICLE V.

APPLICATIONS FOR MEMBERSHIP.

SECTION 1. Applications for membership shall be presented in writing at any annual meeting. This shall be referred to the Executive Board.

SEC. 2. A favorable report from the Executive Board followed by a favorable vote of two-thirds of the voting representatives present, is necessary to elect the applicant to membership.

ARTICLE VI.

FUNDS.

SECTION 1. All funds shall be applied to the necessary expense of the Institute and shall be paid out by the Secretary-Treasurer as ordered or as bills are approved by two members of the Executive Board.

ARTICLE VII.

ALTERATIONS AND AMENDMENTS.

SECTION 1. Any amendment to the Constitution or By-Laws shall be proposed in writing at a regular meeting. It shall lie over until the next annual meeting and every active member shall be notified of such proposed amendment, when it may be adopted by an affirmative vote of two-thirds of the active members present.

ARTICLE VIII.

Section 1. Roberts' Rules of Order shall be the authority governing this body.

BY-LAWS.

ARTICLE I.

DUTIES OF OFFICERS.

SECTION 1. The duties of the President and Vice-President shall be such as usually pertain to these offices in similar organizations.

SEC. 2. The duties of the Secretary-Treasurer shall be such as pertain to the office of Secretary and Treasurer in similar organizations.

SEC. 3. The President and Secretary-Treasurer shall render an annual report.

ARTICLE II.

DUTIES OF EXECUTIVE BOARD.

SECTION 1. The Executive Board shall receive and act upon all applications for membership. It shall receive and act upon all bills presented to the Institute. It shall provide a program for each regular meeting, which shall be in the nature of papers, exhibits or reports from members upon the several topics pertaining to Dental Pedagogics.

SEC. 2. It shall attend to all business of the Institute and render an annual report of its transactions, which shall be published.

SEC. 3. It shall select the place for each meeting and provide the necessary arrangements.

ARTICLE III.

LOSS OF MEMBERSHIP.

SECTION 1. Any college that is in arrears for two years' dues shall be dropped from the roll.

SEC. 2. Any college dropped from the roll for the cause mentioned in Section 1 of this Article shall be required to pay all dues owing at the time it was dropped before it can be voted on for reinstatement.

ARTICLE IV.

MASTER OF EXHIBITS.

SECTION 1. At each annual meeting the Executive Board shall appoint a Master of Exhibits to serve until the close of the next annual meeting. He shall have full charge of the exhibits and shall make a report to the Institute.

SEC 2. The Master of Exhibits shall have power to appoint such assistants as he may deem necessary .

APPENDIX A.

MEMBERS IN ATTENDANCE.

Dr. A. D. Black, Northwestern University Dental School.
Dr. C. R. E. Koch, Northwestern University Dental School.
Dr. F. W. Gethro, Northwestern University Dental School.
Dr. J. Eisenstadt, Northwestern University Dental School.
Dr. F. D. Leach, Northwestern University Dental School.
Dr. H. C. Lawton, College of Dentistry, University of Minnesota.
Dr. H. W. Morgan, Vanderbilt University, Department of Dentistry.
Dr. J. H. Phillips, Vanderbilt University, Department of Dentistry.
Dr. W. E. Grant, Louisville College of Dentistry.
Dr. H. B. Tileston, Louisville College of Dentistry.
Dr. W. M. Randall, Louisville College of Dentistry.
Dr. H. B. Holmes, Louisville College of Dentistry.
Dr. F. W. Rounds, Louisville College of Dentistry.
Dr. J. B. Willmott, Royal College of Dental Surgeons.
Dr. W. E. Willmott, Royal College of Dental Surgeons.
Dr. A. E. Webster, Royal College of Dental Surgeons.
Dr. I. H. Ante, Royal College of Dental Surgeons.
Dr. W. H. Doherty, Royal College of Dental Surgeons.
Dr. B. O. Fife, Royal College of Dental Surgeons.
Dr. H. K. Box, Royal College of Dental Surgeons.
Dr. Wallace Seccombe, Royal College of Dental Surgeons.
Dr. A. D. A. Mason, Royal College of Dental Surgeons.
Dr. C. A. Kennedy, Royal College of Dental Surgeons.
Dr. E. E. Belford, Western Reserve University, School of Dentistry.
Dr. S. W. Allen, Western Reserve University, College of Dentistry.
Dr. J. H. Hood, Western Reserve University, School of Dentistry.
Dr. R. G. Pearce, Western Reserve University, School of Dentistry.
Dr. H. M. Brum, Western Reserve University, School of Dentistry.
Dr. T. W. Brophy, Chicago College of Dental Surgery.
Dr. W. H. G. Logan, Chicago College of Dental Surgery.
Dr. J. P. Buckley, Chicago College of Dental Surgery.
Dr. C. E. Jones, Chicago College of Dental Surgery.

Dr. N. S. Hoff, University of Michigan, College of Dental Surgery.
Dr. R. W. Bunting, University of Michigan, College of Dental Surgery.
Dr. M. S. Ward, University of Michigan, College of Dental Surgery.
Dr. L. P. Hall, University of Michigan, College of Dental Surgery.
Dr. E. T. Loeffler, University of Michigan, College of Dental Surgery.
Dr. A. J. Hall, University of Michigan, College of Dental Surgery.
Dr. C. J. Lyons, University of Michigan, College of Dental Surgery.
Dr. F. C. Cole, University of Michigan, College of Dental Surgery.
Dr. H. S. Bailey, University of Michigan, College of Dental Surgery.
Dr. E. L. Whitman, University of Michigan, College of Dental Surgery.
Dr. H. T. Smith, Ohio College of Dental Surgery.
Dr. W. H. O. McGehee, Ohio College of Dental Surgery.
Dr. C. D. Lucas, Indiana Dental College
Dr. F. R. Henshaw, Indiana Dental College.
Dr. H. R. Raper, Indiana Dental College.
Dr. J. D. Patterson, Kansas City Dental College.
Dr. C. C. Allen, Kansas City Dental College.
Dr. A. Hoffman, University of Buffalo, Dental Department.
Dr. C. K. Buell, University of Buffalo, Dental Department.
Dr. J. O. McCall, University of Buffalo, Dental Department.
Dr. E. S. Packwood, University of Buffalo, Dental Department.
Dr. J. R. Hicks, University of Buffalo, Dental Department.
Dr. W. R. Montgomery, University of Buffalo, Dental Department.
Dr. T. A. Hicks, University of Buffalo, Dental Department.
Dr. J. L. Garretson, University of Buffalo, Dental Department.
Dr. E. J. Farmer, University of Buffalo, Dental Department.
Dr. W. H. Lane, University of Buffalo, Dental Department.
Dr. B. Holly Smith, Baltimore College of Dental Surgery.
Dr. E. Hoffmeister, Baltimore College of Dental Surgery.
Dr. S. H. Guilford, Philadelphia Dental College.
Dr. G. S. Junkerman, Cincinnati College of Dental Surgery.

Dr. J. P. Harper, St. Louis Dental College.
Dr. H. A. Rathburn, St. Louis Dental College.
Dr. H. M. Semans, Ohio State University, College of Dentistry.
Dr. W. C. Graham, Ohio State University, College of Dentistry.
Dr. H. V. Cottrell, Ohio State University, College of Dentistry.
Dr. A. J. Bush, Ohio State University, College of Dentistry.
Dr. C. H. Hebble, Ohio State University, College of Dentistry.
Dr. E. W. Martindale, Ohio State University, College of Dentistry.
Dr. C. W. Strosnider, Ohio State University, College of Dentistry.
Dr. J. H. Kennerly, Washington University Dental Department
Dr. H. E. Friesell, University of Pittsburgh, School of Dentistry.
Dr. F. C. Friesell, University of Pittsburgh, School of Dentistry.
Dr. H. S. Haslett, University of Pittsburgh, School of Dentistry.
Dr. J. S. Ashbrook, University of Pittsburgh, School of Dentistry.
Dr. J. F. Biddle, University of Pittsburgh, School of Dentistry.
Dr. Robt. Zugsmith, University of Pittsburgh, School of Dentistry.
Dr. C. O. Booth, University of Pittsburgh, School of Dentistry.
Dr. P. V. McParland, University of Pittsburgh, School of Dentistry.
Dr. L. W. Ohl, University of Pittsburgh, School of Dentistry.
Dr. A. B. French, University of Pittsburgh, School of Dentistry
Dr. S. D. Emrich, University of Pittsburgh, School of Dentistry
Dr. A. E. Evans, University of Pittsburgh, School of Dentistry.
Dr. J. C. Hipple, University of Pittsburgh, School of Dentistry.
Dr. E. C. Shryock, Universityy of Pittsburgh, School of Dentistry.
Dr. H. D. Fonda, University of Pittsburgh, School of Dentistry.
Dr. Ellison Hillyer, New York College of Dentistry.
Dr. A. R. Starr, New York College of Dentistry.
Dr. F. B. Moorehead, University of Illinois, College of Dentistry.
Dr. D. M. Gallie, University of Illinois, College of Dentistry.
Dr. W. H. Walker, University of Illinois, College of Dentistry.
Dr. E. D Coolidge, University of Illinois, College of Dentistry.
Dr. L. E. Bake, University of Illinois, College of Dentistry.

Dr. J. C. McGuire, University of Illinois, College of Dentistry.
Dr. Wallace Wood, Jr., Tulane University, College of Dentistry.
Dr. H. L. Wheeler, College of Dental and Oral Surgery, New York.
Dr. J. E. Nyce, College of Dental and Oral Surgery, New York.
Dr. A. J. Brown, Howard University, Dental Department.
Dr. A. W. Starbuck, Colorado College of Dental Surgery.
Dr. E. A. Johnston, Tufts College Dental School.
Dr. Jas. Keltie, Tufts College Dental School.
Dr. C. W. Farrington, Tufts College Dental School.
Dr. S. W. Bowles, Georgetown University, Dental Department.
Dr. W. C. Davis, Lincoln Dental College, University of Nebraska.
Dr. O. J. Fruth, Barnes Dental College.
Dr. Jos. Nolin, Laval University, Dental Department.
Dr. A. H. Hipple, Creighton University, College of Dentistry.
Dr. E. H. Bruening, Creighton University, College of Dentistry.
Dr. R. L. Simpson, Medical College of Virginia, Dental Department.
Dr. J. A. Gardner, University of Tennessee, College of Dentistry.
Dr. D. M. Cattell, University of Tennessee, College of Dentistry.
Dr. J. D. Towner, University of Tennessee, College of Dentistry.
Dr. A. W. Thornton, McGill University, Department of Dentistry.
Dr. T. O. Heatwole, University of Maryland, Dental Department.
Dr. P. E. Neil, Meharry Dental College.
Dr. H. C. Miller, North Pacific College of Dentistry.
Dr. H. L. Banzhaf, Marquette Dental School.
Dr. C. T. Rosenbaum, Marquette University Dental School.
Dr. S. W. Foster, Southern Dental College.
Dr. C. N. Hughes, Southern Dental College.
Dr. C. V. Vignes, Loyola University, School of Dentistry.

GUESTS.

Dr. J. Leon Williams, New York.
Dr. G. W. Clapp, New York.
Dr. A. W. Jarman, Post-Graduate School of Dentistry of Philadelphia.

Dr. H. P. Carlton, Oakland, California.
Dr. E. S. Gaylord, New Haven, Connecticut.
Dr. O. V. King, Huntington, Indiana.
Dr. G. W. Wilson, Cleveland.

APPENDIX B.

MEMBERSHIP COLLEGES WITH REPRESENTATIVES PRESENT.

Northwestern University Dental School.
College of Dentistry, University of Minnesota.
Vanderbilt University, Department of Dentistry.
Louisville College of Dentistry.
Royal College of Dental Surgeons.
Western Reserve University, School of Dentistry.
Chicago College of Dental Surgery.
University of Michigan, College of Dental Surgery.
Ohio College of Dental Surgery.
Indiana Dental College.
Kansas City Dental College.
University of Buffalo, Dental Department.
Baltimore College of Dental Surgery.
Philadelphia Dental College.
Cincinnati College of Dental Surgery.
St. Louis Dental College.
Ohio State University, College of Dentistry.
Washington University Dental Department.
University of Pittsburgh, School of Dentistry.
New York College of Dentistry.
University of Illinois, College of Dentistry.
Tulane University College of Dentistry.
College of Dental and Oral Surgery, New York.
Howard University, Dental Department.
Colorado College of Dental Surgery.
Tufts College Dental School.
Georgetown University, Dental Department.
Lincoln Dental College, University of Nebraska.
Barnes Dental College.
Laval University, Dental Department.
Creighton University, College of Dentistry.
Medical College of Virginia, Dental Department.
University of Tennessee, College of Dentistry.
McGill University, Department of Dentistry.

University of Maryland, Dental Department.
Meharry Dental College.
Western Dental College.
North Pacific College of Dentistry.
Marquette University Dental School.
Southern Dental College.
Loyola University, School of Dentistry.

APPENDIX C.

MEMBERSHIP COLLEGES NOT REPRESENTED.

University of California, College of Dentistry.
University of Iowa, College of Dentistry.
University of Pennsylvania, School of Dentistry.
University of Southern California, College of Dentistry.
Medico-Chi of Philadelphia, Department of Dentistry.
Texas Dental College.
Dalhousie University, Faculty of Dentistry.
Harvard University Dental School.
George Washington University, Department of Dentistry.

OFFICERS AND COMMITTEES OF THE ENSUING YEAR.

President

Dr. Harry M. Semans, 710 North Park St., Columbus, Ohio.

Vice-President

Dr. Shirley W. Bowles, Washington, D. C.

Secretary-Treasurer.

Dr. John F. Biddle, 517 Arch St., N. S. Pittsburgh, Pa.

Executive Board.

Dr. A. W. Thornton, McGill University, Montreal, Canada.
Dr. R. W. Bunting, Ann Arbor, Michigan.
Dr. A. D. Black, Chicago, Illinois.

Local Committee of Arrangements.

Dr. W. F. Lasby, University of Minnesota, College of Dentistry, Minneapolis, Minnesota.
Dr. T. B. Hartzell, Minneapolis, Minnesota.
Dr. H. A. Maves, Minneapolis, Minnesota.

Master of Exhibits.

Dr. H. C. Lawton, University of Minnesota, College of Dentistry, Minneapolis, Minnesota.

Assistant

Dr. F. G. Cole, Ann Arbor, Michigan.

Commission on Nomenclature

Dr. F. B. Moorehead, 1470 Peoples Gas Bldg., Chicago, Ill.
Dr. S. H. Guilford, Philadelphia, Pa.
Dr. A. H. Hipple, Omaha, Nebraska.

Commission on Text-Books

Dr. Ellison Hillyer, 1143 Dean St., Brooklyn, N. Y.
Dr. A. E. Webster, Toronto, Canada.
Dr. C. J. Grieves, Baltimore, Maryland.

Commission on Operative Technics

Dr. C. H. Hebble, 830 South High St., Columbus, Ohio.
Dr. W. H. Doherty, Toronto, Canada.
Dr. J. M. Walls, Minneapolis, Minnesota.

Commission on Prosthetic Technics

Dr. W. E. Willmott, 96 College St., Toronto, Canada.
Dr. A. Hoffman, Buffalo, N. Y.
Dr. G. S. Cameron, Montreal, Canada.

LIST OF DENTAL COLLEGES

MEMBERS OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

The following list of Dental Colleges, together with their respective Deans, is given in the order in which the Colleges joined the Institute.

	Year of Admission	School	Dean	City
1.	1894	Northwestern University, Dental School	Dr. G. V. Black	Chicago
2.	1894	College of Dentistry, University of Minnesota	Dr. Alfred Owre	Minneapolis
3.	1894	Vanderbilt University, Department of Dentistry	Dr. Henry W. Morgan	Nashville
4.	1894	Louisville College of Dentistry	Dr. Wm. E. Grant	Louisville
5.	1894	Royal College of Dental Surgeons	Dr. J. B. Willmott	Toronto
6.	1894	Western Reserve University, School of Dentistry	Dr. Edward E. Belford	Cleveland
7.	1894	Chicago College of Dental Surgery	Dr. Truman W. Brophy	Chicago
8.	1894	University of Michigan, College of Dental Surgery	Dr. N. S. Hoff	Ann Arbor
9.	1894	Ohio College of Dental Surgery	Dr. H. T. Smith	Cincinnati
10.	1894	University of California, College of Dentistry	Dr. James G. Sharp	San Francisco
11.	1895	University of Iowa, College of Dentistry	Dr. F. T. Breene	Iowa City
12.	1895	Indiana Dental College	Dr. F. R. Henshaw	Indianapolis
13.	1895	Kansas City Dental College	Dr. J. D. Patterson	Kansas City
14.	1895	University of Buffalo, Dental Department	Dr. D. H. Squire	Buffalo
15.	1895	University of Pennsylvania, School of Dentistry	Dr. E. C. Kirk	Philadelphia
16.	1896	Baltimore College of Dental Surgery	Dr. W. G. Foster	Baltimore
17.	1896	Philadelphia Dental College	Dr. S. H. Guilford	Philadelphia
18.	1896	Cincinnati College of Dental Surgery	Dr. G. S. Junkerman	Cincinnati
19.	1896	St. Louis Dental College	Dr. J. P. Harper	St. Louis
20.	1897	Ohio State University, College of Dentistry	Dr. H. M. Semans	Columbus
21.	1897	Washington University, Dental Department	Dr. J. H. Kennerly	St. Louis
22.	1898	University of Pittsburgh, School of Dentistry	Dr. H. E. Friesell	Pittsburgh
23.	1898	New York College of Dentistry	Dr. F. D. Weisse	New York City
24.	1900	University of Illinois, College of Dentistry	Dr. F. B. Moorehead	Chicago
25.	1901	Tulane University, College of Dentistry	Dr. Wallace Wood, Jr.	New Orleans
26.	1903	College of Dental and Oral Surgery, New York	Dr. William Carr	New York City
27.	1903	University of Southern California. College of Dentistry	Dr. Lewis E. Ford	Los Angeles
28.	1903	Howard University, Dental Department	Dr. Edw. A. Balloch	Washington, D. C.
29.	1903	Colorado College of Dental Surgery	Dr. H. A. Fynn	Denver
30.	1903	Tufts College Dental School	Dr. C. F. Painter	Boston
31.	1905	Georgetown University, Dental Department	Dr. Shirley W. Bowles	Washington, D. C.
32.	1905	Medico-Chi. of Philadelphia, Dept. of Dentistry	Dr. I. N. Broomell	Philadelphia
33.	1907	Lincoln Dental College, University of Nebraska	Dr. W. Clyde Davis	Lincoln, Neb.
34.	1909	Barnes Dental College	Dr. George H. Owen	St. Louis

	Year of Admission	School	Dean	City
35.	1909—	Laval University, Dental Department	Dr. Eudore Dubeau	Montreal
36.	1910—	Creighton University, College of Dentistry	Dr. A. H. Hipple	Omaha
37.	1911—	Medical College of Virginia, Dental Department	Dr. R. L. Simpson	Richmond
38.	1911—	University of Tennessee, College of Dentistry	Dr. J. A. Gardner	Memphis
39.	1911—	Texas Dental College	Dr. O. F. Gambati	Houston
40.	1911—	McGill University, Department of Dentistry	Dr. A. W. Thornton	Montreal
41.	1911—	University of Maryland, Dental Department	Dr. T. O. Heatwole	Baltimore
42.	1912—	Meharry Dental College	Dr. G. W. Hubbard	Nashville
43.	1912—	Dalhousie University, Faculty of Dentistry	Dr. Frank Woodbury	Halifax, N. S.
44.	1912—	Harvard University Dental School	Dr. Eugene Smith	Boston
45.	1913—	Western Dental College	Dr. Wm. J. Brady	Kansas City
46.	1913—	George Washington University, Dept. of Dentistry	Dr. J. Roland Walton	Washington, D. C.
47.	1913—	North Pacific College of Dentistry	Dr. Herbert C. Miller	Portland
48.	1915—	Marquette University-Dental School	Dr. H. L. Banzhaf	Milwaukee
49.	1915—	Southern Dental College	Dr. S. W. Foster	Atlanta
50.	1915—	Loyola University, School of Dentistry	Dr. C. V. Vignes	New Orleans

TABULATED LIST OF SUBJECTS COMPILED FROM COLLEGE CATALOGUES. (*See President's Address*)

	Anatomy			Anaesthesia			Bacteriology			Chemistry and Metallurgy			Comparative Dental Anatomy			Dental Anatomy			Dental Pathology			Histology			Materia Medica and Therapeutics			Operative Dentistry			Operative Technics			Oral Hygiene			Oral Surgery			Orthodontia			Pathology			Physical Diagnosis			Physiology			Prosthetic Dentistry			Radiography		
	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed	*Text Books	†Hours Uncertain	‡Hours Fixed
1	[illegible]ern University Dental School		284			48	1		128	3		496	1		32	1		160	1		64	2		320	1		128	1		1220	1		132				1		92	1		32	1		64	0		4	2		164	1		1348						
2	[illegible] Dentistry, University of Minnesota					0																																														
3	[illegible] University, Department of Dentistry						1	V		2	V											3	V		3	V		2	V																							
4	[illegible] College of Dental Surgery		300	2		30	2		60	4		300	2		20	2		160	2		40	3		70	2		120	2		350	2		130	1		10	3		90	1		50	2		60	0		0	0		0	2		220	4		4			
5	[illegible] College of Dental Surgeons				V			V			V			V			V			V		4	V			4	V								0	4	V														6		220	6		220	1		29	4	
6	[illegible] Western University, School of Dentistry		176		V		1	V		3		224			0	1		96	1		0	1	V		1	V					1		256			0	1	V				32			0			0	2	V		7	V				5	6
7	[illegible] College of Dental Surgery				V			V		2	V				0			0	1	V		2	V		1	V		1	V						0	1	V												2	V		7	V		9	6	
8	[illegible] College of Dental Surgery			1	V		3		36	3		272			0	3	V		1	V		1	V		3	V		1	V						0	1	V												3	V		7	V		9	7	
9	[illegible] of Michigan, College of Dental Surgery				V		1		0	4	V				0			0			0	2	V		2	V		1	V						0	1	V												3	V		7	V		8	8	
10	[illegible] College of Dental Surgery					8	3	V		4		320	1	V		3	V		0	3	V		5	V		7	V		1	V						0	1	V												4	V		7	V		9	9	
11	[illegible] of California, College of Dentistry					48			16	3		272			0			68	2		120	3		144	3		1308	1		160						0	1	V												6	V		7	V		10	10	
12	[illegible] of Iowa, College of Dentistry			1		0	1		0	4	V				0	1		0	1		0	1		0	1		0									0	1	V												6	V		7	V		11	11	
13	[illegible] Dental College		64	2		32	4	V		5	V		1		32	1		32	1		32	4		64	3		64	1		192			96			4		64	2		32	1		0	0		0	1	V		2284	1	V		12	12	
14	[illegible] Dental College		192			0	1		32	1		144			0	1		32	1		112	4		160	1		96	1		1376						0	1		64	1		96	1		64	2		32	1		0	2		160	1	V		13	13	
15	[illegible] of Buffalo, Dental Department					0	2	V		3	V				0			0			0	1	V		2	V									0	1		48	2		64				0		0	1		0	2		768	1	V		14	14	
16	[illegible] of Pennsylvania, School of Dentistry					0	2	V		2	V		1	V		1	V				0	1	V		2	V		1	V						0	1		0	2	V					0		0	2	V					1	V		15	15	
17	[illegible]more College of Dental Surgery					0	1	V		2	V		1	V		1	V				0	1	V		2	V		1	V						0	1		0	2	V					0		0	2	V					1	V		16	16	
18	[illegible]delphia Dental College		226	1	V		1	V		3	V		1	V		1	V				0	1	V		3	V		1	V						0	1		0	2	V					0		0	2	V					1	V		17	17	
19	[illegible]cinnati College of Dental Surgery				V			V		2	V		1	V		1	V				0	1	V		3	V		1	V						0	1		0	2	V					0		0	2	V					1	V		18	18	
20	[illegible] Dental College		238		V			V		4		192			0			32			32			112			160			1504			512			32			116			32			0			192	0		1308		V		19	19	
21	[illegible] Dental College		243		V	34			272			256			0			34			0			120			85			1098			174			0			106			86			0			210	0		1651				20	20	
22	[illegible] State University, College of Dentistry		270		V	0	1		30	4		585			0	1		30	1		30	2		90	1		0	1		0			300			0	1		0	1		30			0			0	0		1050				21	21	
23	[illegible] Washington University, Dental Department		156		V	32	1		24	2		288			32	1		96	1		96	2		128	2		96	1		644			448			0	1		64	1		64			0			0	1		128	1		1376				22	22	
24	[illegible] University of Pittsburgh, School of Dentistry			2	V		0		0	3	V				0			0	1		0	1		0	1		0	1		460			0	1		0	2		0	2		0			0			0	2		0	1		1376	1	V		23	23	
25	[illegible] New York College of Dentistry		180	1		0			112	3		208			16			32	1		256	3		192	2		1046				2		256	1		0	2		416	1		160	2		112			0	2		0	2		350	1	V		24	24	
26	[illegible] University of Illinois, College of Dentistry			3	V		1		48	2		288			0	1	V		2	V		2		128	1		57	1	V		1	V		1	V		0	2	V		1	V		2	V		48			0	1		160			1056				25	25	
27	[illegible] Tulane University, Dental Department					0	2		32	2		224			0			0	1		32	1		64	4		80	6		384						0	1		0	2	V		1	V		4	V		20	1		50	2	V		26	26	
28	[illegible] College of Dental and Oral Surgery, New York		512	1	V										0			0	1	V		3	V		2	V		64	1	V							0	1		0	2	V					3		64	1		192	1	V		27	27	
29	[illegible] University of Southern California, College of Dentistry				V		2	V		4	V				0			0	1	V		3	V		1	V		96	3	V							0	1		0	2	V					0		0	2	V					1	V		28	28	
30	[illegible] Howard University, Dental Department					10			150			150			0			0	1	V		3	V		1	V		120									0	1		0	2	V					0		0	2	V					1	V		29	29	
31	[illegible] Colorado College of Dental Surgery		231		V			V		3	V				0			0			0	2	V		2	V		1	V		2876			600			0	1		0	2	V					0		0	2	V					1	V		30	30	
32	[illegible] Tufts College Dental School				V			V		4	V				0			0			0	2	V		2	V		1	V								0	1		0	2	V					0		0	2	V					1	V		31	31	
33	[illegible] Georgetown University, Dental Department		603	1	V	0	3	V		8	V		1	V	0	2	V		8	V		4	V		1	V		5	V						0		0	6	V		4	V		6	V		0	1	V		2910				32	32	
34	[illegible] Medico-Chi of Philadelphia, Dept. of Dentistry		256	1		0	1		128	3	V				0	1		256	1	V		2	V		1	V		144	2	V		1	V		1020			0	1		64	1	V		1		64	1	V		0	1		0	2	V		1	V		32	33	
35	[illegible]mon Dental College, University of Nebraska				V		2	V		3	V				0	1	V		1	V		2	V		2	V		2	V						0		0	4	V		1	V		64	1	V		1	V		0	1		0	2	V		1	V		33	34	
36	[illegible] Barnes Dental College				V		1	V		3	V				0			0			0	1	V		1	V		1	V						0		0	4	V		1	V		64	1	V		1	V		0	1		0	2	V		1	V		34	35	
37	[illegible] Laval University Dental Department				V		1	V		3	V				0			0			0	1	V		1	V		1	V						0		0	4	V		1	V		64	1	V		1	V		0	1		0	2	V		1	V		35	36	
38	[illegible] Creighton University, College of Dentistry		128		V		1		32	2	V		1	V		1	V		1	V		1	V		1	V		1	V						0		0	4	V		1	V		64	1	V		1	V		0	1		0	2	V		1	V		36	37	
39	[illegible] Medical College of Virginia, Dental Department		656		V			V		3	V				0			0			0	1	V		1	V		1	V						0		0	4	V		1	V		64	1	V		1	V		0	1		0	2	V		1	V		37	38	
40	[illegible] University of Tennessee, College of Dentistry				V	64			224						0			0			0	1	V		1	V		1	V						0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		38	39	
41	[illegible] Dental College				V	0									0			0			0	1	V		1	V		1	V						0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		39	40	
42	[illegible] Dental College				V	4	V			3	V				0	1	V		2	V		2		210	3	V		1	V						0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		40	41	
43	[illegible] of Maryland, Dental Department				V	48	1	V		4	V				0			0			0	2	V		4	V		256	2	V							0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		41	42	
44	[illegible] College				V		2	V		2	V				0			0			0	2	V		2	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		42	43	
45	[illegible] Dental College				V		1	V		3	V				0			0			0	1	V		1	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		43	44	
46	[illegible]				V		1	V		3	V				0			0			0	1	V		1	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		44	45	
47	[illegible]				V		1	V		3	V				0			0			0	1	V		1	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		45	46	
48	[illegible]				V		1	V		3	V				0			0			0	1	V		1	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		46	47	
49	[illegible]				V		1	V		3	V				0			0			0	1	V		1	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		47	48	
50	[illegible]				V		1	V		3	V				0			0			0	1	V		1	V		0									0		0	4	V		1	V			1	V		1	V		0	1		0	2	V		1	V		48	49	

*35 give Text Books. †25 give hours uncertain. ‡1 gives nothing. 139 give hours 64 to 704

*1 gives Text Books. †25 give hours uncertain. ‡1 gives nothing. 136 give hours 48 to 272

*1 gives Text Books. †25 give hours uncertain. ‡22 give hours 16 to 144

*3 gives Text Books. †24 give hours uncertain. ‡22 give hours 32 to 256

*1 gives Text Books. †24 give hours uncertain. ‡21 gives nothing. 132 give hours 32 to 256

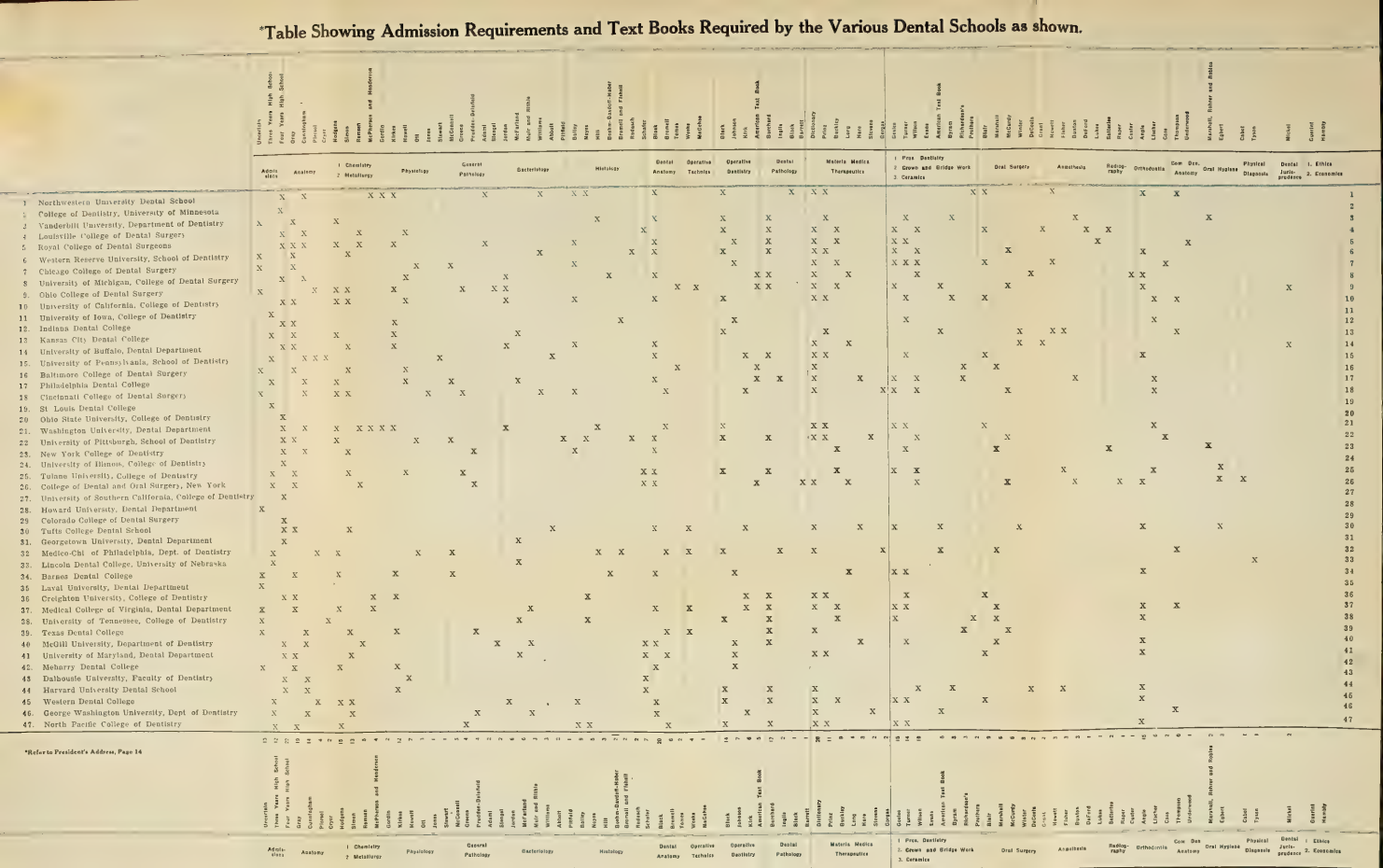
*1 gives Text Books. †24 give hours uncertain. ‡21 gives nothing. 110 give hours 32 to 256

*3 gives Text Books. †24 give hours uncertain. ‡22 give hours 32 to 256

*4 give Text Books. †24 give hours uncertain. ‡21 gives nothing. 122 give hours 32 to 256

*16 give Text Books. †24 give hours uncertain. ‡21 gives nothing. 122

*Table Showing Admission Requirements and Text Books Required by the Various Dental Schools as shown.



		Admissions	Anatomy	Chemistry	Metallurgy	Physiology	General Pathology	Bacteriology	Histology	Dental Anatomy	Operative Technics	Operative Dentistry	Dental Pathology	Materia Medica Therapeutics	Prosthetic Dentistry	Crown and Bridge Work	Ceramics	Oral Surgery	Anaesthesia	Radiography	Orthodontia	Comparative Anatomy	Dermatology	Oral Hygiene	Physical Diagnosis	Dental Jurisprudence	Ethics	Economics	
1	Northwestern University Dental School		X	X					X			X			X			X	X			X	X					1
2	College of Dentistry, University of Minnesota		X																										2
3	Vanderbilt University, Department of Dentistry	X		X			X			X		X			X			X			X			X					3
4	Louisville College of Dental Surgery		X		X			X			X				X	X		X			X								4
5	Royal College of Dental Surgeons		X	X		X	X		X			X			X	X		X			X				X				5
6	Western Reserve University, School of Dentistry	X		X			X			X		X			X	X		X	X		X								6
7	Chicago College of Dental Surgery	X		X				X	X			X			X	X		X			X								7
8	University of Michigan, College of Dental Surgery		X		X			X			X				X	X		X			X								8
9	Ohio College of Dental Surgery	X				X	X	X			X				X	X		X			X							X	9
10	University of California, College of Dentistry		X	X			X	X			X				X	X		X			X								10
11	University of Iowa, College of Dentistry		X																										11
12	Indiana Dental College			X	X			X				X			X			X			X								12
13	Kansas City Dental College		X		X			X							X	X		X			X								13
14	University of Buffalo, Dental Department			X	X			X			X				X			X			X							X	14
15	University of Pennsylvania, School of Dentistry		X		X	X			X			X			X			X			X								15
16	Baltimore College of Dental Surgery	X			X			X					X		X			X			X								16
17	Philadelphia Dental College		X		X			X			X				X			X			X								17
18	Cincinnati College of Dental Surgery	X			X		X	X				X			X			X			X								18
19	St. Louis Dental College		X																										19
20	Ohio State University, College of Dentistry			X																									20
21	Washington University, Dental Department		X	X		X	X	X	X		X				X	X		X			X								21
22	University of Pittsburgh, School of Dentistry		X	X		X				X	X				X	X													22
23	New York College of Dentistry			X	X			X			X				X									X					23
24	University of Illinois, College of Dentistry		X																										24
25	Tulane University, College of Dentistry	X		X			X					X			X	X		X			X				X				25
26	College of Dental and Oral Surgery, New York	X		X				X				X			X			X			X				X	X			26
27	University of Southern California, College of Dentistry		X																										27
28	Howard University, Dental Department	X																											28
29	Colorado College of Dental Surgery		X																										29
30	Tufts College Dental School		X	X			X					X			X			X			X				X				30
31	Georgetown University, Dental Department		X																										31
32	Medico-Chi of Philadelphia, Dept. of Dentistry			X	X			X			X		X		X			X			X								32
33	Lincoln Dental College, University of Nebraska		X																							X			33
34	Barnes Dental College	X		X			X				X				X						X								34
35	Laval University, Dental Department	X																											35
36	Creighton University, College of Dentistry		X	X																									36
37	Medical College of Virginia, Dental Department	X		X		X	X					X			X	X		X			X			X					37
38	University of Tennessee, College of Dentistry	X			X																								38
39	Texas Dental College	X		X		X		X				X			X			X			X								39
40	McGill University, Department of Dentistry		X	X			X																						40
41	University of Maryland, Dental Department		X	X		X						X			X	X		X			X								41
42	Meharry Dental College	X		X		X		X				X			X														42
43	Dalhousie University, Faculty of Dentistry		X	X																									43
44	Harvard University Dental School		X	X				X				X			X			X			X								44
45	Western Dental College		X		X	X	X					X			X			X			X								45
46	George Washington University, Dept of Dentistry		X		X		X					X			X			X			X								46
47	North Pacific College of Dentistry		X	X			X					X			X			X			X								47
			13	12	2	3	7	3	7	7	3	8	1	1	20	11	9	4	3	2	15	2	6	1	2	1	1	2	

*Refer to President's Address, Page 14

PROCEEDINGS

OF THE

Twenty-Third Annual Meeting

OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

HELD AT

MINNEAPOLIS, MINNESOTA

January Twenty-Fifth, Twenty-Sixth and Twenty-Seventh, Nineteen Hundred and Sixteen

Published by

American Institute of Dental Teachers

NEXT MEETING, PHILADELPHIA, PENNSYLVANIA
JANUARY 23, 24 and 25 1917

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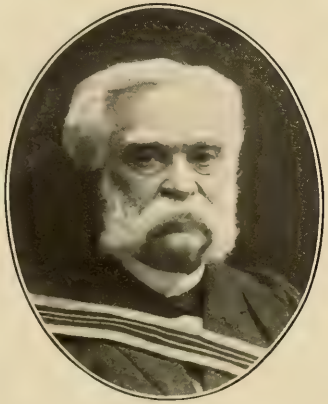
ABRAM HOFFMAN, Secretary-Treasurer

529 Franklin Street, - Buffalo, N. Y.



DR. JAMES BRANSTON WILLMOTT

DR. FANEUIL DUNKIN WEISSE

DR. GREENE VARDIMAN BLACK

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LIST OF OFFICERS OF THE AMERICAN INSTITUTE OF DENTAL TEACHERS

FORMERLY INSTITUTE OF DENTAL PEDAGOGICS

From Date of Organization **Organized at Chicago, August 18th, 1893**

TEMPORARY CHAIRMAN—H. A. Smith, Cincinnati TEMPORARY SECRETARY—J. A. Dale

Annual Meeting	Year	Place	President	Vice-President	Secretary-Treasurer
1	1893	Chicago, Ill.	D. M. Cattell, Chicago		J. A. Dale
2	1894	Old Point Comfort, Va.	D. M. Cattell, Chicago	T. E. Weeks, Minneapolis	J. F. Stephan, Cleveland
3	1895	Asbury Park, N. J.	T. E. Weeks, Minneapolis	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
4	1896	Saratoga, N. Y.	H. W. Morgan, Nashville	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
5	1897	Chicago, Ill.	G. V. Black, Chicago	N. S. Hoff, Ann Arbor	D. M. Cattell, Chicago
6	1898	Cincinnati, O.	N. S. Hoff, Ann Arbor	H. P. Carlton, California	H. J. Goslee, Chicago
7	1899	Philadelphia, Pa.	H. P. Carlton, California	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago
8	1900	Nashville, Tenn.	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago	H. B. Tileston, Louisville
9	1901	Pittsburgh, Pa.	H. J. Goslee, Chicago	J. D. Patterson, Kansas City	H. B. Tileston, Louisville
10	1902	Chicago, Ill.	J. D. Patterson, Kansas City	H. B. Tileston, Louisville	W. E. Willmott, Toronto
11	1903	Buffalo, N. Y.	H. B. Tileston, Louisville	H. W. Whitslar, Cleveland	W. E. Willmott, Toronto
12	1904	Louisville, Ky.	S. H. Guilford, Philadelphia	D. R. Stubblefield, Nashville	W. E. Willmott, Toronto
13	1905	New York City	D. R. Stubblefield, Nashville	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto
14	1906	Chicago, Ill.	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto	B. E. Lischer, St. Louis
15	1907	New Orleans, La.	W. E. Willmott, Toronto	Ellison Hillyer, Brooklyn	B. E. Lischer, St. Louis
16	1908	St. Louis, Mo.	Ellison Hillyer, Brooklyn	John Q. Byram, Indianapolis	B. E Lischer, St. Louis
17	1909	Toronto, Canada	John Q. Byram, Indianapolis	D. M. Gallie, Chicago	Fred W. Gethro, Chicago
18	1910	Washington, D. C.	D. M. Gallie, Chicago	H. E. Friesell, Pittsburgh	Fred W. Gethro, Chicago
19	1912	Chicago, Ill.	H. E. Friesell, Pittsburgh	D. H. Squire, Buffalo	Fred W. Gethro, Chicago
20	1913	Pittsburgh, Pa.	D. H. Squire, Buffalo	Fred W. Gethro, Chicago	John F. Biddle, Pittsburgh
21	1914	Buffalo, N. Y.	Fred W. Gethro, Chicago	H. M. Semans, Columbus	John F. Biddle, Pittsburgh
22	1915	Ann Arbor, Mich.	H. M. Semans, Columbus	S. W. Bowles, Washington, D. C.	John F. Biddle, Pittsburgh
23	1916	Minneapolis, Minn.	S. W. Bowles, Washington, D.C.	John F. Biddle, Pittsburgh	Abram Hoffman, Buffalo

TWENTY-THIRD ANNUAL MEETING

OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

MINUTES

The twenty-third annual meeting of the American Institute of Dental Teachers convened at the Hotel Radisson, Minneapolis, Tuesday morning, January 25th, 1916.

The meeting was called to order by President Harry M. Semans at 10 o'clock.

Dean Alfred Owre, College of Dentistry, University of Minnesota, gave an address of welcome, response being made by Dr. Ellison Hillyer, Brooklyn.

Calling Vice-President Bowles to preside, the President then read his address (see page 12), which was discussed by Drs. Fred W. Gethro, W. E. Willmott, A. Hoffman, T. W. Brophy, Alfred Owre, and E. C. Kirk, Dr. Semans closing the discussion. The President then resumed the chair.

The Secretary-Treasurer presented his report (see page 33), which was accepted, the Treasurer's report was referred to the Executive Board for auditing.

The President suggested that the Institute pause in its work for a few moments to honor the memory of the three beloved brothers who have departed from this life during the past year—Dr. G. V. Black, Dr. J. B. Willmott, and Dr. F. D. Weisse. Addresses commemorative of the life and work of each were then given by Drs. C. R. E. Koch, A. W. Thornton, Ellison Hillyer, and T. W. Brophy (see page 35).

It was moved that as soon as the reports upon the death of the three members as above have been prepared and printed, the Secretary shall send marked copies of same to the families of the deceased, that they may see the eulogies that have been passed. Motion seconded. Carried.

Dr. C. H. Hebble, Columbus, presented Report of Commission on Operative Technics (see page 42).

TUESDAY AFTERNOON.

The meeting was called to order by the President at 2:30 o'clock.

The Secretary read the minutes of the morning session, which were approved.

Dr. A. W. Thornton reported that the Executive Board had audited the Treasurer's accounts and found them correct.

Dr. H. E. Friesell, Pittsburgh, presented Report of Committee on Operative Dentistry and Dental Anatomy (see page 44). Discussed by Drs. D. H. Squire, Don M. Gallie, A. R. Starr, W. S. Russell, Henry W. Morgan, E. A. Johnson, A. B. Crane, F. B. Noyes and R. W. Bunting, Dr. Friesell closing the discussion.

Dr. F. E. Roach, Chicago, presented Report of Committee on Prosthetic Dentistry, Orthodontia, Crown and Bridge Work (see page 61). Discussed by Drs. S. W. Bowles, G. W. Dittmar, Alfred Owre, Martin Dewey, A. W. Thornton, J. E. Nyce, T. W. Brophy, and F. B. Noyes, Dr. Roach closing the discussion.

Dr. W. E. Willmott, Toronto, presented Report of Commission on Prosthetic Technics (see page 81). No discussion.

TUESDAY EVENING.

The meeting was called to order by the President at 8 o'clock.

The Secretary read the minutes of the afternoon session, which were approved.

Dr. F. B. Moorehead, Chicago, presented Report of Committee on Oral Surgery, Anesthesia, Physical Diagnosis and Radiography (see page 87). Discussed by Drs. T. W. Brophy, E. H. Long, H. R. Raper, A. B. Crane, and F. W. Frahm, Dr. Moorehead closing the discussion.

Dr. C. R. E. Koch, Chairman of committee appointed last year for the purpose of soliciting contributions to the dental hospitals which have been established in Europe under the auspices of the Red Cross Society, presented his report (see page 105).

Dr. F. W. Gethro supplemented the report by reading letter received by him from Mr. A. E. Freer of Chicago, relative to the relief work undertaken by this committee.

It was moved by Dr. J. H. Kennerly that the Institute extend to its committee an expression of unanimous appreciation and thanks for the magnificent work that has been done, and that inasmuch as all of the individual members of the Institute are also members of the National Dental Association, any future work along this line shall be delegated to it. Motion seconded by Dr. H. C. Miller. Carried.

It was moved by Dr. T. W. Brophy that a vote of thanks be extended to Mr. Freer for his liberal donation to, and interest in, the relief work undertaken by our committee, and that Dr. Gethro be authorized to convey to him the expression of our appreciation. Motion seconded by Dr. Ellison Hillyer. Carried.

Report of Committee on Anatomy, Histology and Physiology was presented by Dr. F. B. Noyes, Chicago, (see page 109). Discussed by Dr. A. E. Webster, and Dr. Noyes in closing.

The meeting adjourned, to meet at 9 o'clock a. m. Wednesday—for visit to the University of Minnesota, and at the Hotel Radisson at 9 o'clock a. m. Thursday for regular session.

THURSDAY MORNING.

The meeting was called to order by the President.

The Secretary read the minutes of the last session, which were approved.

Dr. M. L. Ward, Ann Arbor, presented Report of Committee on Chemistry, Metallurgy and Physics (see page 120). Discussed by Drs. E. C. Kirk, Alfred Owre, and W. H. Welker, Dr. Ward closing the discussion.

Dr. E. D. Brown, Minneapolis, presented Report of Committee on Materia Medica and Therapeutics (see page 134). Discussed by Drs. Herman Prinz, Alfred Owre, A. E. Webster, E. H. Long, E. C. Kirk, and F. B. Noyes, Dr. Brown closing the discussion.

Dr. Ellison Hillyer, Brooklyn, presented Report of Commission on Text-Books (see page 150), which was discussed by Drs. W. E. Willmott, D. M. Cattell, J. D. Patterson, and A. E. Webster, Dr. Hillyer closing the discussion.

It was moved by Dr. Willmott that the Executive Board be instructed to arrange for a meeting of sections during one session at the next annual meeting, and that the chairmen of the sections be added to the existing commission on text-books. Motion seconded. Carried.

THURSDAY AFTERNOON.

The meeting was called to order by the President at 2 o'clock.

The Secretary read the minutes of the morning session, which were approved.

Dr. H. C. Lawton, Minneapolis, presented Report of Master of Exhibits (see page 155) which was approved.

Dr. A. E. Webster, Toronto, presented Report of Committee on General Pathology, Dental Pathology and Bacteriology (see page 156). Discussed by Drs. A. D. Black and J. D. Patterson, Dr. Webster closing the discussion.

The President announced that those desiring to discuss the general subject of the Four-Year Course would now be given opportunity to do so. Drs. E. C. Kirk, A. D. Black, J. H. Kennerly, A. H. Hipple, W. E. Willmott and A. B. Crane participated in the discussion which followed (see page 165).

The following resolution was introduced by Dr. Kirk:

RESOLUTION.

RESOLVED, That it is the sense of this meeting that we approve the plan of a Four-Year Course of not less than 4800 working hours, the curriculum to consist of not less than 4200 hours devoted to such subjects as are deemed essential to the technical and scientific education of the dental practitioner, with the understanding that ancillary subjects shall be elective and not consume more than 600 hours of the course.

Upon motion, unanimously carried, the foregoing resolution was adopted.

Dr. J. F. Biddle moved that a vote of thanks be extended to the Faculty of the University of Minnesota and to the profession of the Twin Cities for the entertainment provided during this meeting, also to the S. S. White Dental Manufacturing Company for furnishing the programs, and to the hotel management for courtesies extended. Motion seconded and unanmiously carried.

Election of officers for the ensuing year then took place as follows:

President, Shirley W. Bowles, Washington.

Vice-President, John F. Biddle, Pittsburgh.

Secretary-Treasurer, Abram Hoffman, Buffalo.

Dr. Thornton's term of office as member of the Executive Board having expired, he was upon motion elected to succeed himself, the membership of the Board now standing as follows:

A. W. Thornton, Montreal, one year;

Russell W. Bunting, Ann Arbor, two years;

Arthur D. Black, Chicago, three years.

On behalf of the Executive Board, Dr. Thornton presented the following report:

The American Institute of Dental Teachers extend to Mr. Forsythe their felicitations and their personal appreciation of the interest and efforts which he has given to dental education; and that we extend to the Forsythe Dental Institute an invitation to send an unofficial delegate to the meeting next year.

Further, that the history of the officers of the Institute whose compilation was undertaken by Dr. J. F. Biddle, be continued by him.

The Executive Board has granted to Dr. F. B. Moorehead, Chairman of Commission on Nomenclature, permission to defer his report until next year.

In surrendering the gavel to President Bowles, the retiring President said:

"Dr. Bowles, it gives me pleasure to present to you the chair of President of the American Institute of Dental Teachers, and I hope that the anticipation on your part will be as great as has been my realization."

President Bowles responded as follows:

"Dr. Semans and Fellow-Members: This is one of the proudest moments of my life. I do not know of any honor that I could cherish more than to be the presiding officer of this body. My association with it has been an uplift, it has made me do better things in other ways than dental work and teaching, and I shall strive to live up to the achievements of my renowned and distinguished predecessor."

The minutes of the session were read and approved.

Adjourned.

J. F. BIDDLE, Secretary.

WORDS OF WELCOME.

DEAN ALFRED OWRE, UNIVERSITY OF MINNESOTA, COLLEGE OF DENTISTRY.

Mr. President and Members of the American Institute of Dental Teachers:

It is needless to say that I responded to the wish of the chairman with alacrity. The very word "Welcome" is encircled with a halo of good feeling and hospitality. Such word is infectious, and it carries with it a certain spiritual enthusiasm which holds us spell-bound. The idea of welcome is so human, we are unconsciously elevated by it to higher thought and action.

Nevertheless, to him who has considered the address of welcome soberly and seriously, one fact is apparent. It is the most conventional thing about a convention. The speaker is expected to do two things.

(1). He shall set forth the unrivalled beauties and advantages of his city as a meeting-place for all organizations, from the butter-makers' convention to the American Institute of Dental Teachers;

(2). He shall direct attention to the pleasure inspired in the hosts by the presence of their guests. Eminently simple. Yet to one who reflects with due gravity on these requirements two objections occur. To point proudly to the merits of one's own institution is a proceeding of questionable modesty; to enlarge upon one's feelings as a host is an undertaking which savors of unction. And meanwhile the soup grows cold. How, then, to seem becomingly modest about one's own; how to be reticently cordial? How, in short, to deliver this thing, an address of welcome? The perplexed speaker recalls with relief an unshakable fact. His effort is in one respect alone akin to wit; the soul of each is brevity. A hasty glance at the clock assures him that at least he has not said too much; and secure in the knowledge that his audience will not be critical of sins of ommission, he herewith extends in unlimited measure a most hearty welcome and quietly takes his seat.

RESPONSE TO THE ADDRESS OF WELCOME.

DR. ELLISON HILLYER, BROOKYLN.

In behalf of the Institute, Dean Owre, we sincerely appreciate all that you have said. This gathering from year to year seems to me to be practically one continuous meeting. We have in the years of our existence gathered in many cities throughout this country

and Canada. We have met on the eastern coast; have gone as far west as the Mississippi at St. Louis; we have gone to the farthest south in New Orleans and now are practically at the farthest northern point geographically that we have traveled. These meetings have been virtually adjournments from year to year. One of the satisfactory things about this organization is this: that as soon as the gavel is laid down by one presiding officer, the executive board begins its work for the next session. It is absolutely continuous in that way and this is why I believe its work is so efficient, for I know of no organization in the dental world that has such an extensive influence. There are very few in the profession that have a knowledge of the existence of this organization and yet the influence of it is felt directly or indirectly by every member of the profession.

With the greatest interest we have come to this particular meeting. We have come for a definite purpose. At this meeting we have the anticipation of considering what we are to do in our coming four-year course and we have as our host a College already in operation of such a course. We therefore have taken special interest in coming here at this particular time and I am certain we will be intensely interested.

As Dean Owre has already stated, the soul of a speech of welcome should be brevity, and I want to make my response just as brief as was his.

Those of us who returned from San Francisco last summer choosing the Canadian Pacific route found that at one place in the Rocky Mountains the divide of waters parted the streams going to the east and to the west. It seems as if the influence of this organization is very similar in its character to the parting of the waters by "The Great Divide," because its influence is so potent that the work done here is exerted for good or for ill. Thus far it has been for great good. When we go back to our respective schools, the influence of everything done here is naturally carried to the students with whom we come in contact and, in return, each one of these students thus impressed carries the influence on to every patient whom he subsequently meets. Thus I believe that unconsciously all members of the dental profession, as well as those who are dependent upon them for service, are influenced by what we are doing here.

Dean Owre, we thank you very much indeed for your cordial welcome, and I assure you we shall take advantage of every opportunity offered to gain from our visit here the beneficent results which will mean so much in the future.

PRESIDENT'S ADDRESS.

DR. HARRY M. SEMANS.

"This Association shall be known as the 'American Institute of Dental Teachers.' Its object shall be the improvement of the educational department of the colleges comprising its membership, by interchange of thought and formation of methods." I am quoting Sections one and two of Article I in the Constitution and By-laws of this association. Then I quote again, this time from the address of our President last year. "The object of this Association should be to develop and improve methods of teaching, to teach men what to teach and how to teach, to inspire teachers, especially the younger men to continued and better work." In a general, perhaps haphazard sort of way, I believe we are carrying out the object of this Association as called for in the Constitution and as urged upon us by our last President. If not we would not have continued as an Association; we are men with our time full of work, having no time to trifle away in useless hours and days at a season of the year when the hour is literally golden. We have shown a steady healthy growth in attendance. We have held our places of meeting with but few exceptions in the centrally located cities. Our few departures from these places of easy access, have been at a sacrifice in numerical attendance, but have been of undoubted benefit and inspiration to local conditions. Our average attendance at all our meetings, exclusive of attending members living in the place of meeting, has been about seventy-five. We had our largest attendance, again exclusive of home members, at Ann Arbor last year, when one hundred and twenty were present. Our growth can be appreciated by showing a few statistics of the travelling representatives at some of our meetings. In eighteen hundred and ninety-seven, at Chicago, there were twenty-one present; in nineteen hundred and two, again in Chicago, sixty-four were present; and at our last Chicago meeting, in nineteen thirteen, we had one hundred and seventeen visiting attendants. In nineteen three, at Buffalo, eighty were present, whereas in nineteen fourteen, again at Buffalo, one hundred and sixteen represented the out of town attendants.

As is well known, the object of the Institute, the first few years, was the building up and standardizing of our departments of technical instruction. A desire for discussion on all phases of dental instruction soon led to a change in the early purpose, and we now cover the entire dental curriculum. But all the time the formation and standardizing of methods has been the guiding

spirit of our meetings. Some fifty colleges are participating in our meetings. Last year, one hundred and thirty or more teachers participated as representatives from forty-one of these colleges. These fifty colleges have a probable aggregate of two thousand teachers. In other words our best attended meetings will represent about one in fifteen. Ten or twelve of these colleges consistantly present an attendance of three or more at each meeting. Others consistantly take turns in presenting an absence of members: distance and expense no doubt, governs in most of these cases. The people of the new world are noted for their belief in benefits derived by elbow rubbing. While we hear, at all meetings and conventions, a common remark, "I don't care to listen to this paper, I can read it when published," yet we know that consciously or unconsciously, much good is derived by direct contact.

We all agree then that the Institute has a good reason for exsistance, that its future is assured; but are we really doing all we can to carry out the objects as set forth in our Constitution? It is true that we do not meet to pass rules and laws, requiring that methods and procedures should be carried out in certain stipulated fashion, nor that certain courses shall be prescribed in our several curricula. We come, as uninstructed delegates or attending members, to a non-legislative Association. We come with our hopes and aspirations high, to breathe of the spirit in the air, to give a little, to take something home. Do we? We surely do or else why do we still come? As our work has progressed, we have rightfully felt the need of several permanent Commissions. These Commissions will yield results, as time goes on, only because their several efforts are recognized and made use of by the dental educational world. We have continual instances where reports of our Commissions are kindly received at the meetings, yet, upon later investigation, the results back home are rather a minus quantity. In many instances our papers are the results of careful investigation and effort by genuinely inspired teachers, and again rather negligable results are shown. This is not altogether so for dental education is not at a standstill, we are and have been slowly progressing. Yet, a few months ago, one of our most enthusiastic dental propogandists for a better and wider scientific field in dentistry, was asked if he could suggest or furnish a graduate in dentistry, having the true dental and medical inspirational aspect, having also a keen insight and ability for scientific research, to do work that undoubtedly would result in giving our profession, and humanity at large, much benefit. Could he? Perhaps. He might find one, perhaps.

This gentleman finished this statement by remarking "It's a tragedy," gentlemen, it's a tragedy.

Fortunately tragedies do not always kill, they become tragedies when the world at large realizes the awful or woefulness of the time and events, then when fully realized, they act in some way as inspirational impulses; or else the world would have been done long ago. We are progressing, we have improved all along the line during the life of our Association, but there is much more that we can do. If this meeting is to have something of value to it, something to give that will really and truly help to make our profession "The Profession," should we not see to it that the results may be wider, realized sooner? Do you and I realize that we are here to take back home something that will make the trip not only beneficial to ourselves, but to those at home? We have our published proceedings, a copy mailed to all recent attendents, and to that extent your officers are doing their best to reach a much larger number than naturally will be found at the meetings. But what are we as attendants at these meetings doing to carry inspiration to the readers? Too many of us return with clear recollections of this or that new and interesting anecdote (well that we should too), but with little or nothing to say as to the reality of the meetings. Last year we had much to say about our Commission's report on a Syllabus in Operative Technics with minimum requirements. We as an Association fathered this report, eight members saw fit to give it discussion and the Institute accepted its report, not I grant you, as a rule, but as a resolution. How many of us know what the Commission advised as a minimum requirement? If we hope to get the best out of our meetings, we must not stop with a casual reading of the proceedings, nor with happy recollections of a delightful time at the last meeting, we should make these meetings a big item each year back home, we should see that they are used as one of the methods, as I quoted from President Gethro's address last year, "To teach men what to teach and how to teach, especially the younger men to continued and better work." We as delegates to this meeting are here in trust from our respective places, let us resolve that something more than a delightful visit shall result as an outcome of this meeting. A real teacher does not care for adverse criticism. A uniformally accepted opinion on how to do things, generally lacks spice. A Commission's report or essayist's paper will be of more benefit to our various educational groups even if discussed adversely, than if allowed an attention like unto the proverbial "innocuous disuetude."

I believe in a few instances our proceedings receive more than careless reading. I believe occasionally a faculty group may be found, willing to spend some time and study on these proceedings. I know that there are some faculty groups that meet occasionally with "The good of the cause" the topic of conversation and discussion. During the past few years our proceedings have been published and mailed at a comparatively early period. This has been done at an increased cost to the Institute, because various members have felt that the good of the meetings should get to the various faculty groups while the spirit of each meeting is still inspiring and alive. I am firmly convinced that we are morally obligated to give these proceedings a careful investigation in each of our faculty groups. I am sure it would be of great interest to us, at this or any other meeting, if we had some kind of a report, or composite opinion from our several faculties, after a fair discussion of the previous proceedings. I would suggest that we, individually, do now earnestly obligate ourselves to set aside a few faculty meetings at the most opportune time after the published proceedings are received, and give to the Institute the recognition its work deserves. If we are willing to accept and maintain membership in the Institute, we should see to it that our essayists and our Commissions mean more than a means towards a few pleasant hours away from home.

I do not wish to disparage our meetings at all, for as teachers we have been getting closer and closer together during the last double decade. It is because of these meetings that we know how various teachers in different schools teach their respective subjects. Our interests are mutually bound together. The inspiration of the work and influence of this organization is manifested right now in a wide spread, unanimous desire to broaden the dental curriculum. We are now in the midst of the realization of this desire. The enthusiasm of that small body of men, twenty-four years ago, organized to interchange thoughts and ideas of teaching along line purely technical, has been our controlling spirit. Our field to-day is broader, perhaps more scientific, and this is largely because they believed in co-operation. The past ten years has witnessed a change greater than we probably realize. In a careful study of the various four year curricula presented at the ill-starred period of nineteen-three, it is of interest to note that all subjects then advocated and truly needed are found to-day in our present three courses. And to my mind this is an eloquent tribute to the work of this body. We have progressed far beyond any hope manifested at that time, we have

a genuine realization of the needs of a broader, more scientific mental equipment of our student out-put.

The desirability of a uniform curriculum for all the schools appeals to us all. Never was there a time when such uniformity was more needed. Yet I do not believe it will ever be possible for us to standardize to an absolute degree. Perhaps through our interchange of ideas we will drift into a practically uniform curriculum, recognizing however the control of environment and certain conditions which we as an organization cannot control, perhaps not wise to desire to control, which will preclude an absolutely uniform curriculum. Our support should be and will always be to proper methods of teaching. We must avoid overloading; the assimilation of certain facts, and a comprehending comparison of them with other related truths, can come only through deliberate methods of study on the part of our students. We have now passed into the realm of true pedagogical preliminary preparation. We recognize the four-year preparatory course of instruction as part of our scheme for dental education. We should also recognize what is being taught in these preparatory four years. From an ideal standpoint only one preparatory course is in the nature of wise acceptance. A course embodying a good mixture of the cultural with the scientific. In the past our High Schools have carried out too much of a finishing off policy, to be of genuine service as feeders to the various professional college courses. However, this is changing, and today a young man or young woman can come up through the High Schools fairly well equipt to take a plunge into vocational studies. Let me illustrate: Physics, Chemistry and Manual Training are three subjects which today can be recognized, in their elementary courses, by granting advanced credits upon entrance to all colleges. No less than ten years ago Elementary Chemistry, and Elementary Physics composed a large item in the Freshman year of all college scientific courses; whereas, today, these subjects are now so well taken of in most High Schools, that advanced general chemistry and higher physics have become the courses generally occupied by freshmen. Some ten years ago a census was taken of all dental students in a number of our colleges to determine how many had studied physics as a preparatory study. Only an average of twelve in one hundred had had physics. Last year another census was taken and an average of eighty-eight out of a hundred had had physics. A complete reversal in ten years.

Because of the necessities and needs of our students and their welfare, we should not be so liberal as to say that environment and

local features shall allow a large latitude, each institution to choose entirely to suit its own desire; that's chaotic. For the past fifteen years we have heard much about the cultural additions to our dental curriculum; about the practical additions and development to this same curriculum. Radicalism often makes a good platform to stand upon, but the good of all causes demands a certain definite amount of in the middle of the road attitude, after the campaign is over. Dr. G. V. Black once said, "I would like to speak on one point that has been referred to in the discussion by one of the speakers. It is a very important point, too, in connection with this matter of education, and we should strive to understand it. The education of the machinist has been referred to, and the fact mentioned that it requires four years to make a machinist. During these four years this man may spend all his time solely in the machine shop; solely at practical work, so that he may become able to turn his journals to a nicety, cut a toothed wheel perfectly, adjust his machines perfectly, do excellent mechanical work, but if this man has not during this time been studying his mathematics and his physics, the laws of motion; and if he has not been studying mechanical drawing and all those things, he will be simply a mechanic to be directed by the master; nothing more." Then I quote again, this time from Doctor Stubblefield, "I am convinced that we have taught too much in the time at our disposal, with the result that we have produced a mental dyspepsia, rather than assimilation, growth and development. What we want is not ingestion, but digestion, so as to permit our men to grow broad and strong. We have not had sufficient time to mature. Put the student in the way to help himself; that is the best you can hope to do with him." Here are two ideas seemingly far apart; yet they are not. We have been making splendid mechanics, but we have not been giving our fundamental and our allied or associated scientific subjects the right attention to allow the proper growth and development of our students into professional men. I do not infer that we have been lacking in professional men, you cannot keep some men down; by force of ambition, and personal character we have all about us scientifically trained and developed professional men.

It might be of interest to compare our present three year course with what was being done fifteen years ago when the four year course almost had its inception. By taking a number of College schedules, representing a fairly good comparison, I have been able to obtain an average which I would say is fairly accurate. In nineteen-two I found the number of hours in class room, laboratory and

clinic to average 2460. Last year the average was 3840. Anatomy had increased from 195 to 315. Physiology from 100 to 204. Chemistry from 150 to 338. Histology from 105 to 136. Bacteriology from 110 to 136. Dental Anatomy from 30 to 102. Prosthetic Dentistry from 575 to 735. Operative Dentistry from 100 to 168. Pathology from 30 to 85. Orthodontia from 60 to 106. Oral Surgery and Anesthesia from 30 to 70. Dental Medicine from 30 to 90. Practice from 885 to 1285. On the other hand Metallurgy fell from 45 to 36. While hours devoted to special types of work remained much the same.

After a careful study of the variously planned and agreed upon four-year curricula as presented during the years of 1901, 1902 and 1903, I find that our present three-year courses average up better, both in total hour service and in pedagogical arrangement and selection. We were averaging last year 240 more hours than asked for in that ill-starred four-year campaign. The reason for this is easily explained because of the advance from a scant seven-month year to a full nine-month year, from five days a week in most cases to an average of five and a half days. When we failed to carry out the plans for a four-year curriculum many believed a tragedy had occurred. Perhaps it was a tragedy, but like all tragedies, it was followed up with an awakening into the knowledge that much cleaning up, much improvement internally could be done; and it was done.

And now we have arrived. The four-year curriculum is imperative. Why? Any number of reasons as noted in our meeting last year. For one thing the fundamental branches are inadequately done. Then we have crowded so much into the three years that our students are not properly taught the art of study. We have too much of the cramming aspect and too little of the deliberative absorption of knowledge. The vocational side suffers and the cultural side is a comparatively minus quantity. The crux of the matter is simply this, we can make a better man out of a student with four years opportunity to get under the skin than in three years. There is no argument against that. The hand writin is on the wall "The next great step in Medicine should come from the dental profession; will they do it?" (Dr. Mayo.)

Granted then that the change to four years has at last arrived, many are anxious to know what the changes may be. Imperative situations do not generally become settled after long and indecisive deliberations. The needs are so decisive that action commences

spontaneously. And so are we now manifesting decisive action in this our imperative situation. In our own Institution I can illustrate what I mean by spontaneous action of what seems to be an imperative situation. Quite a number of students, perhaps twenty or more, moved both by their own desires and by advice from various sources, have registered in some one of the other colleges in the State University, expecting to spend at least four years in Collegiate work, before gaining their dental degree. In a number of instances our attention last spring and summer was called to others who desired to spend one or more years in Arts or Science in some one of the other Colleges or Universities in our vicinity. Although we had not expected to make arrangements for a four-year course prior to the fall of nineteen-sixteen, yet this active desire to get as much as they could caused us to accept the situation as an unannounced optional four-year course, commencing last fall. The question then arises what are they taking? Animal Biology for one thing, manifested in Elementary Zoology and Comparative Anatomy; Advanced General and Qualitative Chemistry for another thing. (It is to be noted the Elementary Chemistry had been obtained in preparatory or High School work in most of these instances.) Thirdly: English, manifested in Description, Narration, Exposition and Argumentation. These three subjects are accompanied with enough other subjects to make up the required credits for one full year. Naturally without much of a restraining hand the other subjects are quite diversified, although Technical Drawing is quite popular. In such a situation Dental Anatomy and Prosthetic Dentistry to some extent should be given the second semester or in Summer School. The imperative situation has come up to us and it is up to us to accept it and take care of it.

As we prepare ourselves for this change, let us not overlook improvement in clinical and technical instruction, make them stronger. We should have available at least two full years of practice growth, in which we can instill reliance and self assurance: but let us not forget that the weak side has been the scientific fundamentals, those sciences which are the foundation of all professional knowledge and practice. A true professional man is still a student, a seeker after truth. It is true we cannot make all our students professional men and women, nor can we carve out professional men and women, for in spite of college environment it is up to the man, for all men are self made after all, but we can improve our methods so as to be instrumental in awakening a greater interest in our students in scientific attainments.

I desire to place before you a four-year curriculum which will be followed by the college with which I am associated. I also desire to state that this course is not altogether original with us, but has been selected as a very desirable one, at least as a start, after a year's investigation into what seems to be our needs, governed by advice and council from both dental and general educational sources. I would not take the stand that this course cannot be changed. Council and experience will cause alterations I have no doubt: but I feel that we have here something to nail our flag to; to look to as a decidedly improved opportunity to train our students towards more scientific, more professional attributes.

At the meeting of your Executive Committee, at the close of the meeting at Ann Arbor, it was decided that it would be well to present, in their respective departmental groups, all subjects now given in the present three-year course, at our next meeting at Minneapolis, after a careful study of the needs for changes of each such subject. It was felt that a careful discussion of the individual studies as well as collective course as now in existence would show what new studies might with great advantage be added. I therefore ask that you give careful and considerate attention to the program as it will follow. Nicholas Murray Butler says in his new book "The Meaning of Education," "If education cannot be identified with mere instruction, what is it? What does the term mean? I am sure it must mean a gradual adjustment to the spiritual possessions of the race, with a view to realizing one's own potentialities and to assisting in carrying forward that complex of ideas, acts and institutions which we call civilization." Centuries ago an old philosopher said, "No man ever became great who lived unto himself" and again he said, "Civilization is advanced in ratio to the loss of individualism and gain of communial spirituality."

DISCUSSION.

Dr. Fred W. Gethro, Chicago

Before entering into a discussion of the admirable paper that we have just listened to, I desire to congratulate our worthy President on this very able address and to express to him my warm personal tribute. Dr. Semans has been one of the Institute's most loyal supporters. I have not searched the records—I did not need to—but I am sure that if I had, I would have found that he has been in constant attendance at all of our meetings from the opening to the final session; and I want to say

further that, in season and out of season, he has always been a faithful, methodical and untiring worker.

In his characteristic fashion he has called our attention to the objects and ideals of our organization, pointing out our strength and mentioning our weaknesses. He could have given a fine complete address mentioning only the pleasant things—not offering a criticism; but he has the "Good of the Cause" at heart, and he wants us to increase our efficiency and has the courage to say that he does not think we are taking full advantage of our opportunities. I will have to agree that the criticism is a just one. I think you will all agree that in our meetings there are papers read by our best writers and reports made by our most capable teachers that are unknown to the great bulk of dental teachers to say nothing of the profession at large. It is also true that our meetings should be much better attended. Instead of an average of 75, our average should be at least twice as large, but it was pleasing to hear Dr. Semans say that a review of the attendance showed a steady, healthy growth, and that our meeting last year in Ann Arbor was the record for attendance.

A still closer examination of our attendance record of last year will reveal some extremely satisfactory conditions. Out of a membership of fifty colleges, some of them 4,000 miles apart, forty-one had representatives in Ann Arbor. When we consider that two of those not represented are in California, one in Texas, and another in Nova Scotia, the showing is all the more remarkable. But I am satisfied we can do very much better in this matter of attendance in the future than we have done in the past.

I am truly curious, and perhaps you are, to know how one of our representatives can on all occasions gather from ten to twenty of his faculty and attend any and all of these meetings no matter where they may be held. I confess that it is beyond me, and I hope he will tell us how he does it. While we may not all feel able to approach that enviable condition, none of us should be content without a good representation at every meeting.

I am sure there isn't another dental organization in existence exerting a greater influence in moulding the present and future of dentistry; I am sure there isn't another dental organization in the country whose members are more enthusiastic or loyal. Our real strength is clearly shown by the fact that practically every recognized dental school in this country and Canada holds membership in this organization. It is a pity that more of our young teachers

cannot attend and take part in our meetings. The high motive and quality of many of the papers presented, the true good fellowship expressed in our numerous small gatherings, the entire lack of politics, and the genuine desire to exchange ideas, is such that no real teacher can attend these meetings without receiving a real inspiration.

I heartily commend the suggestion of Dr. Semans that we who do attend the meetings should make a very definite effort to carry the suggestions and inspirations back to our fellow teachers who have not been in attendance. It is a duty that we owe to all of the teachers of our respective faculties. It is a duty that we owe to this organization and to our profession.

In the school with which I am connected it has for many years been a definite order of business at our regular monthly dinner-meetings, for each member of the faculty to make a report of dental societies visited within the month. All such reports become a matter of record, for they are incorporated in the minutes of the faculty. In this connection I want to say that I know of no method that is quite so beneficial to a faculty as the combination of social and business that can be so well arranged with a dinner and social hour preceding the faculty meeting.

I fully agree that the four-year course was an absolute necessity and not in any sense a luxury. The time at our disposal in a three-year course is not sufficient to give our students a good grounding in the fundamental branches. It is true that we have not been teaching him the art of study. Most educators agree that where a student puts in more than six hours a day in study, he is not doing his best work. When he studies beyond that time his efficiency is decreasing instead of increasing. After the average student spends several hours a day in a prosthetic or an operative technic laboratory in addition to the many other lecture and laboratory hours he must take, he is usually in no condition to study at night. I am well satisfied that we are requiring or permitting the student to spend too many hours per day in one or both of these technic laboratories. I do not say that he is getting too much knowledge in his technical studies or that he is getting too proficient in his technical procedures, but I do say with emphasis that he is putting in too much time on technical work in comparison with the time available for the other fundamental branches. He is putting in too many hours in clinical work. A review of the total hours devoted to prosthetic and operative dentistry as published in the various catalogues, shows that these subjects are in many instances

so great that they outweigh all the other combined subjects. Again, if you will look at many of our catalogues you will be surprised to note the great amount of space devoted to operative and prosthetic dentistry, especially prosthetic dentistry, and then note the extremely small space devoted to the other subjects.

Much of this is an inheritance from the older days when few subjects were taught in the dental schools and it was necessary to keep the student's time occupied for two years of six months courses. Some of it is undoubtedly due to the fact that we cater to the student's wishes. Students prefer to work in the technic laboratories or in the clinic, and I fear we are too much influenced by their desires.

During the last year we have reduced the number of hours in our freshman operative technic almost 100 hours, and the same statement is true of our freshman prosthetic technic. This was made necessary by the lecture-recitation plan which requires that our student do more studying and more reading. Let me repeat: I do not say that he is getting too much knowledge in his technical studies or that he is getting too proficient in his technical procedures, but I do say with emphasis that he is putting in too much time on technical work as compared with the time available for the fundamental branches, he is putting in too many hours in clinical work.

Dr. W. E Willmott, Toronto

I want to add my word of appreciation of the President's Address, and also of his kindness in sending me a copy of the Address as long ago as he did. And I want to apologize for not having had time to write my remarks, as Dr. Gethro has done.

It is very gratifying indeed to be reminded of the continued growth of the organization, and the President might also have mentioned the growth of membership as well as the growth in attendance at our meetings. This shows appreciation of the organization on the part of the different schools of the country. To my mind the efficiency of the schools today is due partly, if not wholly, to the work of this organization. As the last speaker has said, no teacher can attend the meetings without receiving an inspiration that will assist him in his work for years after. The older members of the organization will remember that fifteen or twenty years ago if we mentioned a word about *what* to teach, we would be very severely called down by the chairman, especially if that chairman happened to be Dr. Weeks or Dr. Cattell. That time has

passed. Then we gradually got into *when* we should teach the various subjects, while now we are getting to the idea of *what* to teach. And as we are venturing on what was formerly forbidden ground, it seems to me we might go a little farther and have a committee prepare what should be taught in the different subjects. It would be of great assistance to new men on the staff if they could have a brief outline as to what, in the opinion of leading teachers of the country, should be taught in that subject.

The idea of the faculties discussing the reports to be presented at this meeting is a good one, and I think that would be especially applicable after this meeting, when the different schools are endeavoring to arrange the four-year course. We will never come to a uniform curriculum—as long as there are two deans in the country we will have two arrangements of the course.

Dr. Semans stated that he did not expect the outline presented to be discussed; then why did he send me a copy and ask me to discuss it?

Dr. Semans: I did not quite mean that; I referred to a lengthy discussion.

Dr. Willmott: There are one or two things I would like to point out in this proposed sketch.

I noticed that before Christmas, the first year, the students have 28 hours a week, after Christmas 35. It seems to me that with the freshmen the first thing is to put them into the idea and habit of work. If in lecture or quiz work we give 7 hours a week before Christmas, allowing time to loaf, then try to make them work more than 7 hours after Christmas, we will have our hands full. It would be better to do the opposite.

In the fourth year, I notice that the students have 42 hours work each week. Dr. Gethro has pointed out, and I agree, that it is entirely too much to make a man work 42 hours a week for thirty-two weeks, for at the end of that time he would be pretty nearly dead, he has had no time for out-door recreation.

The order of subjects cannot be particularly criticized. I like Dr. Semans' idea of adding English. Those of us who read examination papers know how beneficial to some students such a course would be. But when we consider the time allotted to the different subjects, the proposed course is open to severe criticism. For instance, take operative dentistry: This is one of the most important subjects in our curriculum; three hours a week for possibly 24 weeks in the second year in the laboratory; one lecture a week for 56

weeks (two years), or 3.3 per cent of the entire time of the four years is devoted to operative dentistry—a subject that will occupy considerably more than seventy-five per cent of a man's time after graduation. Compare 72 hours in the operative technic laboratory, with 250 hours in the chemical laboratory and 96 hours in the physiological laboratory. What are we making—physiologists and chemists, or are we endeavoring to educate dentists? The subjects of operative dentistry, dental anatomy, and porcelain work, all combined, occupy 6.39 per cent of the entire time, while chemistry is over 7 per cent, anatomy over 6.7 per cent, prosthetic dentistry and crown and bridge work combined over 20 per cent.

Under this proposed curriculum it looks to me very much as though we were proposing to teach our students restorative rather than preventive dentistry. I grant you that, when we consider the exhibit in prosthetic dentistry last year, we realize that restorative dentistry is very necessary. Until we teach modern prosthetic dentistry it is necessary to teach considerable prosthetic technic. Compare 3.3 per cent of the entire time devoted to operative dentistry, with the percentage of time given to physiology—more time devoted to physiology than to operative dentistry. That includes lectures also. Considerably more time is given to comparative dental anatomy, which is important, but not as important as pathology.

I have no desire at all to disparage a general education on the allied subjects, but it does seem to me, to take a sentence out of the address, "we have been making splendid mechanics, but we have not been giving our fundamental or associated or allied subjects the right attention to allow proper growth and development of our students into professional men." Will twice the time spent in chemistry as spent in operative dentistry, make better professional dentists? Will more time spent in physiology and comparative dental anatomy than in operative dentistry, make better professional dentists?

Dr. Semans has mentioned that this outline is only a suggestive course, and so I would like to suggest some alterations in it.

Dr. Abram Hoffman, Buffalo

As intimated by the last speaker, we who have been chosen to open the discussion of the President's Address were favored by having a copy of it in ample time to enable us to look it over carefully. Unfortunately, however, as we go down the list of discussers, the men occupying the last places are put

to a possible disadvantage because of the likelihood of the discussion having been complete. Several things in the address impressed me, and I will be brief in getting to the points upon which I desire to touch.

Dr. Semans' address contains a number of very good ideas for discussion at this time, and many of them should be given careful, thoughtful consideration at a time when we have opportunity to think the matter over. I wish to compliment Dr. Semans upon the earnestness and sincerity of his remarks.

To me there are two main themes:

(1). A plea for more completely carrying out the objects as set forth in our Constitution; and,

(2). A plea—shall I say?—for the four-year course, or for the better preparation of those who are to enter the dental profession.

Both themes deserve equal attention. However, the first should be thoroughly considered in this preliminary discussion, because the second, as announced to us, is to form the subject matter of this entire meeting and will subsequently be discussed pro and con and from every possible viewpoint.

The President, expressing himself in several different ways, has questioned just how much good our association is doing to those back home who come to our meetings only occasionally, or perhaps never attend them. And he wonders, too, as to what we can do so that our deliberations may be of more universal value. Both are pertinent questions, and I am glad he has brought them to our attention. There is no denying that the objects of our association are being attained. There is evidence of this upon every side. Perhaps there could have been greater advancement in the twenty-two or -three years of our existence as an Institute, but that is largely a question of numbers in attendance at our meetings. Naturally, all of these 2,000 teachers could not attend the meetings, therefore let us arrange it so as to have the meetings go to the 2,000 teachers. To be sure, the printed proceedings are sent out to many members, but the amount of good they do is a matter of question. The fact that "we as delegates to this meeting are here in trust from our respective places," has some influence, but not as much as it should. It is not enough that we as individuals should profit; we should have a note-book full of good things to take to the fellows back home, which would very materially enhance the value of the printed proceedings in the meetings of our faculties.

The President has given me a thought, and I would like to suggest, possibly to the new executive board, this: Let us assume that at this meeting we have had read and discussed a paper on what should be taught in the operative technic course in the freshman year; instead of having it later appear in print to be read by a very few men and then to become a closed book,—let us select ten or twelve, or more, operative dentistry departments to review the paper and discussion and report their deliberations to the chairman of the operative technic commission, he in turn to embody this summary in his report to be presented at the next meeting of the Institute. There are perhaps 150 or 200 men teaching this particular subject, and I am not sure but that it would be possible and practical to reach them entire instead of but the 30 or 40 represented in the ten or twelve schools. To quote from the address, "Thus we would see to it that the results would be wider and realized sooner."

It has been suggested at different times that we have several permanent commissions. The above suggestion would work out to better advantage in such an event, but the success of the plan is not dependent upon a permanent commission.

Dr. Gethro has brought out the subject of dinner-meetings and their helpfulness. At home we have these dinner-meetings, and we do just as Dr. Gethro has said—discuss teaching topics and the proceedings of the Institute.

With reference to the second theme—the four-year course: We appreciate that the time has arrived for its establishment. But I must disagree when it comes to the "cultural" subjects. Let us choose wisely the subjects that are to be included in the extra year, and with a view to grounding more men with dental ability. We cannot possibly hope to inculcate all of these branches in the time at our disposal, I question the propriety of mixing the "cultural" with the scientific. The place for these is in the high school. There is too much "personal equation" in the matter for us to endeavor to teach English and the like. I appreciate that entirely too many high school graduates come to us poorly prepared for the advanced study of a profession, but it is only practicable for us to correct this through the channel of an increased entrance requirement based upon special work in the high schools, and, in the course of time, a pre-dental course.

A strong point in favor of the four-year course is the fact that in a number of dental schools there is, under present conditions, a decided over-crowding of work with a lamentable lack of time for

digestion and assimilation of what is taught and the opportunity for thoughtful study. The curriculum suggested by Dr. Semans calls for a total of 4752 hours in the four years. We teach from 8 a. m. to 6 p. m. (Dr. Gethro has made a good point in that this is too long), allowing one hour for lunch, for five and one-half days per week, or 49.5 hours per week. This totals 1683 hours per year, which, multiplied by three, makes 5049 hours in three years, as compared with 4752 hours as suggested for the four-year course. In other words, we are now teaching in three years 297 hours more than is proposed for the four-year course. It is apparent that we have time either for including more of the collateral subjects, or for cutting down each day's work and giving more opportunity for recreation, and, as I have already stated, this is a strong point in the argument for the four-year course.

I do not believe that we are here at any time to discuss a uniform curriculum, but to discuss the *minimum* curriculum, and that minimum curriculum, from necessity I believe, will have to be somewhat elastic in order that it may meet the conditions as we find them in several localities.

Dr. T. W. Brophy, Chicago

I would like to say a word. We are extending this course to four years, for what purpose? Is it for the purpose of educating men according to the teachings of a school of liberal arts, or is it to educate men to be better dentists? What is our business? What is this meeting for? It is not for the purpose of formulating a course of study in high school work, or college work, or university work, but it is for the purpose of improving *our* method of bringing the men who come to us up to a higher standard of perfection as practitioners of dentistry, is it not? Then I think we should exact the higher standard for admission and not expect to admit men and teach them the branches which the high school, the college, or the university, is better capable of teaching. I have no patience with the proposition of giving men advanced standing because they have done certain work in the school of liberal arts, which is absolutely outside of the domain of dental teaching. And I sincerely hope that we may not bring into our profession a class of men such as was alluded to in a statement made by the late Dr. Barrett with reference to a man who came to his institution trained in the sciences and in the arts, a man who was familiar with the languages, was a linguist of the highest order, educated in German, French and what not—they were delighted at the University of Buffalo to receive such a man. But Dr. Barrett told me that in

a few months the faculty found that: "This man was absolutely incompetent—that he had the best trained mind and the most ignorant hand of any man ever admitted to the school, and so he was dismissed." We do not want students of that type. We want men who are well educated when they come, and then we want to take them and train them in the curriculum which this organization may see fit to lay down as the proper one, the very best one, for a four-year course of instruction in the science and the art of dentistry, and not in the work that they should do before they are admitted to the dental schools.

Dr. Alfred Owre, Minneapolis

I want to say at the start that five minutes is altogether inadequate for traveling to the bottom of the four-year course; but I assure you that if the two deans who have been preparing the four-year course are given adequate time in which to defend that program, they can put forth arguments which will be convincing.

In regard to some of the remarks made about the four-year course, allow me to refer to the definition of education which our worthy President gave: "The adjustment of the individual to the spiritual possessions of the race." That is the end of all education, technical or otherwise.

When we make the broad claim that we must teach nothing but dentistry, we should inquire, What is dentistry? We borrow from nearly every science. For example, in the four-year curriculum there are certain sciences proposed for the first year of a preparatory character. This arrangement spells economy. The four-year program is well thought out; it is by no manner of means chaotic. It has been built up most carefully, after years of study under the guidance of some of the best educators in this country and abroad. For the first time it has won for dentistry the "O.K." of the educational world. This program has been sent to leaders in the profession and has been returned with criticisms and suggestions. The great Macedonian cry came from Minnesota, "the next step in medicine must come from dentistry." Now we are preparing to take this step. Dentistry had already formulated an answer to this cry. The dental student shall be carefully selected and as carefully prepared.

Dr. Brophy cited an incident occurring in the Dental Department of the University of Buffalo, to the effect that a certain man with academic preparation proved to be one of the worst students

in dentistry the University had ever had. This man should never have been allowed to matriculate in a dental college. In the future dental colleges must choose their material with a recognition of the fact that applicants, in general, fall into two classes: those with an aptitude for the concrete, and those with an aptitude for the abstract. Let us face this fact, and admit only those whose native ability gives them a fair chance for success. Then let us recognize the fact that without spiritual adjustment, without some reference to the higher ideals of life, we shall not get anywhere with our technic. Men lacking such adjustment are not fitted to meet the demands of this humane profession. I admit that we cannot introduce all the collateral subjects we should like to, but we may in part adjust ourselves to this materialistic world while by careful choice of candidates and by the broadest possible program we are making our men as spiritually fit as the conditions of today permit.

Dr. Brophy: I would like to ask Dr. Owre a question, if he will permit: Would you know that a man was unfit for the carrying out of his work as a dental student, until he was started in the course?

Dr. Owre: To determine this in an individual case is a very simple process. An educator of the highest experience, while examining an applicant for the purpose of determining his aptitudes, can discover by a few questions what the applicant takes to and what he does not take to. He should interview every man that applies and not admit pellmell everyone who comes to his college. To go into the subject in detail would require several talks on vocation and aptitudes; but I am sure that a great many educators are following this method today. For instance, take the first question: What was the subject that you liked best in high school? In our profession we have to be concrete. Well and good, the student relates what he took to—there is his aptitude. Is he concrete in his tendency? If so, well and good, then he has a tendency towards a concrete calling, of which dentistry is one, engineering another, medicine another, etc. Did he take to literature, languages, English, etc.? Well and good, then place him on the other side of the fence, for his aptitudes are better in abstract callings. Does he like mechanics, is he accurate and painstaking in his work? It does not take long to determine these things.

There is another method. Give the applicant a test, have your student committee interview him and see what they think about his execution. What we have to do is to discover the applicant's leaning, whether toward the concrete or toward the abstract.

Dr. E.C.Kirk, Philadelphia

May I ask a question? Dr. Owre and some of the speakers who preceded him have spoken of cultural subjects in contradistinction to the technical subjects that will enter into this proposed curriculum. I should like to ask Dr. Owre as the expositor of the spiritual aspect of this subject, whether in making a distinction of that sort he means to imply that the scientific subjects of the dental curriculum, those that are biological in character for example, are lacking in cultural value in developing that spiritual conception to which he refers? And if they are not why do we make that distinction or consider it necessary to put cultural subjects into a curriculum which is already cultural if properly taught?

Dr. Owre: I did not make that distinction. Blacksmithing has cultural value. A man who is spiritually minded can read spiritual value into his technic. His vision is at the blacksmith's bench, the dental chair, or whatever else he works. He creates an atmosphere around him so infectious that it is the very leaven of his community; it is the background, the horizon, of that community; it is responsible for the ideals of the community. To create such an atmosphere is the great work of the dental teacher. He is more than his technic, he is a living soul. Through his technic he can impart the spiritual possession of the race. But if he has a knowledge of the best thought of the race, in literature or art, in sound or line, he is so much the better equipped for his communal mission.

Dr. Semans, (Closing the discussion)

I note that the discussion has anticipated our regular program somewhat, and I am glad of it. A few points were brought out that I would like to touch upon.

The first thing that comes to my mind is Dr. Willmott's reference to seeming lack of balance in some of the subjects found in my tentative curriculum; for instance, between chemistry and operative dentistry. He has, I perceive, noted the proper reading of the curriculum. Each of the two solid columns running up and down the page represent a semester, and items under the heading "D" represents the total number of hours for each semester. But the reading above the columns will indicate what the numbers mean. I will call your attention to the fact that the credit hours are divided in university and college associations as follows: Three laboratory or clinic hours will represent one recitative hour in value. Thus constituting what we call "the credit hour." Thus we have

in column "B" the recitative hours, in column "C" the clinic hours. For instance, in dental anatomy we will find in the second semester of the freshman year two credit hours, one teaching hour and three clinic hours. In the first semester of the second year also one credit hour. This curriculum is not exactly following out what we expect to do next fall, as good suggestions for changes will no doubt come out in the meeting.

I would, then, say to Dr. Willmott that in comparing operative dentistry with chemistry and physiology, just at first thought the curriculum given here does show that operative dentistry is considerably below proper average. But when we finish chemistry in the second year, to a great extent we have finished chemistry for the college course.

But when we finish operative dentistry in the technic laboratory we have not finished operative dentistry. We have operative dentistry with us always, at least half of the clinic practice being operative dentistry. In our four-year course we will probably run 800 to 1,000 hours in the practice of operative dentistry. However, let us not forget that we are also correlating the work done and the knowledge obtained in the physiological, chemical, pathological, and bacteriological laboratories, with the work that we are doing in the practice of dentistry.

Dr. Willmott: Does not prosthetic dentistry come under the same heading then?

Dr. Semans: Yes. In prosthetic dentistry the work in practice will depend upon the environment of each particular school. There are some colleges that have a woeful lack of prosthetic dentistry in practice, others that have a large amount of it. In our school I believe we would run probably two-thirds of the work in practice in operative dentistry, one-third in prosthetic dentistry. I may not be right, but that is just as I now think of the work of the student body in the infirmary.

I will grant you that 4800 hours in the four-year course seems heavy. But I was very much surprised to find that, according to the schedules in the catalogues, great advance has been made in recent years, as Dr. Hoffman has said. I wish when you go home you would compare your schedules as prepared from year to year and find out for yourselves how far ahead you have gone in the past fifteen years in your curriculum. At the present time a number of the colleges are scheduling 5,000 and over hours in three years.

Dr. Owre referred to the vocational test on entrance. In many of the leading universities there is a tendency to-day to try that out. Whether or not the plan will work remains to be seen, but it is being tried out. There are permanent committees being arranged for and appointed in some of our colleges and universities to find out, perhaps at the very beginning, the vocational characteristics of the student as he enters. The idea may be too theoretical, but there is no harm in trying it out. If practical why should we all not avail ourselves of the method?

Quite a number of thoughts have been brought out relative to the problem before us. I know that in many of the papers that will be read and the discussions that will take place during this meeting there will be a great deal of interest manifested. This schedule that I have presented is rather tentative. It should be. There is no reason why we should attempt at the beginning to carve out something and make it exact standard. There must be a beginning, with a yielding here and there, adding to and cutting down, before we get something that will be worth while.

I want to thank the discussers for their kind remarks and their consideration of my effort at trying to give an address that will start the meeting going in the right way.

REPORT OF THE SECRETARY-TREASURER.

The growth of this Institute and its influence as a factor in dental education have been steadily increasing since its inception in 1893 with ten members. Its membership now includes teachers of fifty dental colleges of the United States and Canada, two other schools having withdrawn on account of their absorption by stronger colleges already members of this organization. The original scope of the society has broadened from a consideration of Dental Technics to that of every branch of dental science, while we are now about to advance upon another step in dental progress, namely, the consideration of the proposed four-year dental course, whereby to secure more efficient preparedness of our students.

While there can be no criticism of lack of interest or enthusiasm at our annual meetings, nevertheless, throughout the year it is difficult to secure replies to our correspondence. Upon one matter alone it required 120 letters to secure 46 replies. In the preparation of this year's program, for the advantage of members that they might have a fairly comprehensive idea of the nature of the reports

to be presented and thereby be enabled to take an intelligent part in their discussion, it was deemed advisable to print synopses of said reports. However, of nine synopses requested, four only were received, and they were not received in time for publication. This may seem a small matter, yet is of inestimable importance, when one reflects upon the ultimate value of our proceedings not only as a means of reference but their educative value to members unable to be present. If members but appreciated the need of punctuality in these matters, I feel sure we could secure their co-operation to our mutual advantage.

The Post Graduate School of Orthodontia of the Forsyth Dental Infirmary has made formal application for membership in this body. As our membership in the past has been confined to those colleges only whose completed courses qualified for the degree of Doctor of Dental Surgery, the application of the aforesaid school is placed before you for consideration. Should the Institute decide favorably, this opens up an entirely new field of membership, there being at least six other Post Graduate Dental Schools in the United States.

During the past year the Institute has suffered the loss by death of three of its ablest members, deans of membership colleges: Dr. G. V. Black, of Northwestern University Dental School, one of the founders of this Institute, Dr. J. B. Willmott, of Royal College of Dental Surgeons and Dr. F. D. Weisse, of New York College of Dentistry. It is the first time within the history of any dental organization that such an irreparable loss has been sustained within one year.

Colleges, members 1915		50
Colleges in arrears, 1915		4

Financial Statement.

Carried forward	$724.11	
Dues collected, 1915	300.00	
Dues collected, 1916	620.00	
Interest	8.12	
		$1652.23
Expenditures as per ledger	$983.45	
Balance in bank	668.78	
		$1652.23

Respectfully submitted,

J. F. BIDDLE, Secretary-Treasurer.

January 25, 1916.

IN MEMORIUM.

GREENE VARDIMAN BLACK, D. D. S., M. D., S. C. D., L. L. D

Dr. C. R. E. Koch, Chicago

Northwestern University Dental School is honored by standing at the head of the roll of membership in this Institute. This honor came to it through the earnest devotion to the interests of higher dental education of its distinguished Dean, who has guided its course for nearly a quarter of a century. It would seem, therefore, proper that at this time the Institute should pause for a few moments and note the fact that Greene Vardiman Black, D. D. S., M. D., Sc. D., L. L. D., was relieved of his labors here on August 31, 1915, and that he is no longer with us in the activities of his body and mind; to express the hope that his spirit and his genius will ever attend the deliberations of this association, of which he was the senior member.

Dean Black first saw the light of day in a wilderness of prairie in Scott County, Illinois, on August 3, 1836. He was a son of William and Mary Black, and came, through his grandsire, Captain William Black, from Revolutionary North Carolina stock. Dr. Black's father was born in Milledgeville, Georgia, in 1796. He migrated from Georgia to Tennessee, and removed from there to Scott County, Illinois about 1834. In 1825 he married Mary S. Vaughn. When our Dr. Black was about eight years old, the family moved to Cass County, and settled upon a farm, which throughout the active life and indefatigable work of Dr. G. V. Black, was his haven and refuge of rest. It was here in the bungalow on the old farm, with the familiar whisperings of the leaves on the trees of his childhood days, and the singing of the birds, to whose lullaby he had loved to listen as a tired boy, that he passed to his final rest, leaving behind him a rich legacy, freely given to mankind, in the continuous and persistent effort to know the "why" of things, and to give to the world the benefit of this knowledge.

It is useless for my feeble pen to make an attempt to even record a synopsis of his achievements in a lifetime of scientific research work. The history of the development of scientific dentistry for the last half century is his biography. And yet with all his marvelous labors in professional research work, his mind expanded, and the skill of his hands enabled him to become a master in other arts and sociological problems. His was a rare combination of analytic and constructive ability. His fondness of nature and his

study of life made him a man of broad views. Notwithstanding the recognition—yes we might say adoration—it was his pleasure to receive not only from his confreres with whom his labors were closely allied, from all over this country, and from all over the world as well, he continued to be a plain and generously approachable man. Approbation, honors, glories, distinctions, were received by him in a spirit of acknowledgment to science and art, rather than as things personal to himself, and they had no effect whatever in perturbing that sweet, human disposition which all who knew him intimately recognized and admired.

As a lover of nature, as a student of nature, as a thorough investigator, as a systematic recorder, it is our belief that he was a remarkable product of the Illinois prairies. We might easily stop to ask what might he not have been had he had an opportunity in his earlier days for the intellectual and professional training which is available to men today who enter upon a professional career. Enthusiasm, determination, perseverance, laboriousness, were his characteristics, and he evolved for himself an education, which in the light of his achievements, seems almost miraculous. But in his capacity of teacher, the writer presumes this association should be particularly interested to commemorate his name. Nature seems to have endowed him particularly with qualifications required for successful and impressive instruction to other minds. He had a way with him that would not only carry conviction to a student, but that would impress the facts elaborated in such a way that they could never be forgotten.

Upon a memorable occasion, when all the world was doing him honor at a great social function, he said, "I love the dental profession; I love the work I have been doing." That thought of love for the profession and love for the work we are doing seems to be the key-note and a fit guide to follow, for the members of this association, whose great privilege and duty it is to teach.

Dr. Black left the farm at the age of sixteen, and for a time lived with his brother, Dr. T. G. Black of Clayton, a physician, and in 1857 he began the study of dentistry with his uncle, Dr. J. C. Speer who was practicing at Mt. Sterling, Illinois.

He was married in 1860 to Jane L. Coughennower, who died August 26, 1863. In 1862 he became a soldier in the 129th Illinois Infantry, but was compelled to leave the service by reason of physical disability—not, however, before he had received promotion as

a non-commissioned officer. After recovering his health, he established himself in practice in Winchester, and later in Jacksonville. In 1865 he married Miss Elizabeth Akers Davenport, who now survives him, having been his constant, most devoted, sympathetic companion for nearly fifty years. Within two weeks after the angel of death called Dr. Black to his eternal home, their golden wedding was to have taken place.

DR. J. B. WILLMOTT,

Dr. A. W. Thornton, Montreal

It would be simply a manifestation of mock modesty were I to say that I do not appreciate the honor that has been conferred upon me in asking me to say something in reference to the late Dean of the Royal College of Dental Surgeons of Ontario, Dr. J. B. Willmott. And yet I could have wished that I had known something of this before coming to the meeting this morning, that I might have given thought and effort to saying something which would be more appropriate than anything which may occur to me on the spur of the moment.

As I looked on these three portraits, I was reminded strangely of the first attempt I ever made to earn anything for myself. An artist in the city of Ottawa had made a picture with a strange name and it was produced as a steel engraving. It was after the death Pope Pius IX, and he called the picture "The Pope Does Not Die." And I accepted an agency for it and sold it. The idea was this: It represented the death of Pius the IX, the accession of Leo the XIII, and the handing of the keys by St. Peter to the successor of Pope Pius IX, and he called the picture "The Pope Does Not Die." the man does die but the office is continued.

And so as we look at these faces this morning we are reminded of the phrase we so often use, "God buries his workmen, but carries on his work."

It is your duty and mine not to indulge in any fulsome flattery, not any nauseating encomiums this morning. We can add nothing to the honor that these men's lives have brought. Our duty simply is to try to carry on the great work in which they were engaged.

I knew Dr. Willmott for twenty-five years. When you look at that face you can read in it the fact that he who bore it in life

was a man who had convictions, and he was not afraid to express those convictions. We did not always agree with him, but we were always conscious of the fact that he was honest in what he said and what he did, and "an honest man is the noblest work of God."

When on the morning of the 14th of June I read of Dr. Willmott's death in the Montreal paper, the announcement came to me as a great shock. I immediately went to Toronto to attend his funeral, and as I looked on his face as it lay chiseled in death, the thought came to me and I said to his sorrowing widow, "There is nothing to regret." We have been talking this morning of teachers; Dr. Willmott was pre-eminently a teacher, and no student who ever listened to him had a wrong impression conveyed to him. He always taught them the best, not only the best that was in dentistry, but the best that was in life. He had the courage to say and do the things that perhaps would call down misjudgment upon him, but he would rather be misjudged than to be wrong. And so we think this morning of that line from Tennyson in that beautiful little poem, "The Grandmother." "God, not man, is the Judge of us all when life shall cease." And in that belief he was willing to be misjudged.

These pictures ought to be a personal volume. I have only one son. He is a dentist. I did not want him to go into dentistry, I knew something of the difficulties incident to the dental profession and I tried to persuade him otherwise. But he said to me, "Dad, why should you not want me to go into dentistry? For years, when you have come back from these meetings, haven't you told me of the grandeur of the lives of Black and of Brophy and of Gilmer, and isn't there a possibility that I may become something of the like?" My greatest ambition this morning—I don't know where he is, some place in France,—my greatest ambition is that some of the life that has come to these men might be his.

In passing, let me quote one line from that little poem to which I have already drawn your attention, where an old woman, in referring to the departure of her eldest son, said to her granddaughter:

"He has but gone for an hour,—
Gone for a minute, my son, from this room into the next;
I, too, shall go in a minute. What time have I to be vext?"

We, too, shall be gone in a minute. "Let us so live that we may apply our hearts unto wisdom."

DR. FANEUIL DUNKIN WEISSE.

Dr. Ellison Hillyer, New York

With your permission I will read the memorial which was adopted by our board of trustees, for it impressed me so fully at the time with its appropriateness that I feel there could be nothing added better expressive of our appreciation of Dr. Weisse:

"On June 22d. 1915, at White Plains, New York, a life replete with usefulness to his profession and the community came to its close.

"Dr. Faneuil Dunkin Weisse was for almost half a century a professor of the faculty of the New York College of Dentistry and for eighteen years Dean of the College.

"The value and effect of his connection with and services to the College are beyond estimate and will endure throughout its existence as an educational institution.

"He was greatly honored in his profession, highly esteemed in his public relations, and beloved in his private life.

"His passing has impressed us with a keen sense of loss, well nigh irreparable, but in it we find an incentive to better and nobler things and to ever increasing devotion to the interests of the College to whose welfare his life was devoted."

It seems strange that these three contemporaneous deans, men who were so closely allied personally, should have passed away within the space of a few days. Dr. Willmott went first, then Dr. Weisse and later came the announcement of the passing of Dr. Black. Dr. Black and Dr. Weisse were associated in the closest of bonds. Whenever there was anything of vital importance to be considered, I believe they always conferred, either by letter or by personal conference. It seems eminently fitting that this special time should be set aside for the commemoration of the passing of these men, whose influence upon our lives has been so very,very great.

I think you can all appreciate what the death of Dr. Weisse means to those of us who have for years been associated with him. You, who know him well, know that he was very quiet and undemonstrative in his ways; some have seen the kindliness of his character and others never came to know him well. Those of us who were close to him realize the depth of his character; we realize the

sincerity with which he did things. He did exactly what I thought he would do—killed himself with his work. But if there should be any reward that could come to him, it seems to me this is the highest: *He gave himself to his profession and to his boys.*

I had the great honor of writing a short article for one of the Canadian Journals in regard to Dr. Willmott, in which I could not help referring to the occasion last year when, as a part of our afternoon's entertainment by the University of Michigan, we attended a recital in the great music hall. I had the pleasure of sitting beside Dr. Willmott and it seemed to me that the program rendered on that occasion was indicative of the man: in particular a selection that was given upon the organ seemed to me to be indicative of his rise to the pinnacle which he held. It especially impressed itself upon me at the time inasmuch as I knew that he had just completed fifty years of service in professional life and fifty years of wedded life; all of which was crowned with the degree which was conferred upon him just before he passed away. It should be a matter of the greatest satisfaction to the Royal College of Dental Surgeons not only that this degree was conferred upon Dean Willmott but that he also was honored by being given honorary membership in the Odontological Society of Great Britain.

Dr. T. W. Brophy, Chicago

A great many years have passed away since I made the acquaintance of the distinguished men whom we honor today. I know the career of each one well. I feel very deeply this loss. It is by no means merely the loss of men who have distinguished themselves in their chosen profession, but I feel that it is a personal loss to me. Whatever I may have accomplished in life has been largely due to the influence of these men—men who were always ready, in response to request, to liberally explain anything that came within the range of their knowledge.

When Dr. Willmott laid down his duties for the other life, it left me the senior dean upon the American Continent—thirty-four years now in service. I felt his loss so deeply, and the others coming immediately on—it seemed that we were overwhelmed with a grief that was so hard to bear.

When the world saw fit to bestow honors upon my friend and your friend, Dr. G. V. Black, at a banquet in the city of Chicago, every one contributing to this great event, I made remarks which

I will quote now. "As Abraham Lincoln was in statesmanship, as General Grant was at the head of the army, as Nicholas Senn was as the recognized master surgeon, so in the field of dentistry stood alone this man, Dr. Greene Vardiman Black." And when the world through its representatives canvassed all the members of the profession everywhere for a man who had accomplished more than any one else in the science and in the art of the profession, the world's representatives in the International Dental Federation voted that that man was Dr. G. V. Black and awarded him the first Miller Memorial Medal in recognization of his achievements.

Whenever I went to New York it was my great pleasure to be greeted by my friend Dr. F. D. Weisse. Dr. Weisse was the most potent influence in dental education in the state of New York. Dr. Weisse worked incessantly, and, as has been stated by Dr. Hillyer, he laid down his life for the school and for the advancement of the dental profession. Every impulse of his life was noble.

Dr. Willmott—I almost looked upon him as a father. One time I remarked to him that I myself came very near being a Canadian; my father, my mother, and my senior brother were born near the city of Toronto, and I escaped by a few months and was born in Illinois. I told him I almost felt that if I had been born in Canada I would have escaped the influence of malaria so abundant in the west, and I would have been a stronger man and better able to meet the duties of life. And always afterward he reminded me that I was a Canadian.

Dr. Willmott was a power in the profession of Canada. Forever, when we speak of the dental profession of Canada, he will be thought of. His name is inseparably associated with the profession of the Dominion, and after years have passed, whenever any educational body meets, the name Willmott will be mentioned—the great founder of the college, the man who was capable of carrying the college through all of the changes and vicissitudes to a great success, and who did more than any other man in all Canada to bring to the people high-class, educated professional men. As was said by Dr. Weisse in a discussion at an association meeting not many years ago, when a young man came to them from the Royal College of Dental Surgeons, he always knew that he was a man well prepared to continue the study of dentistry. He was an educated man himself, and I am glad to say that that institution does require for matriculation men of high education.

As Dr. Thornton has so beautifully put the thought, these three men have not passed away, their influence will be felt so long as any one here may live, and beyond that. I have remarked, and I repeat, that one of the greatest heritages of the profession is the influence of the lives of men such as these. How poor we would be if it were not for this inheritance. This organization would be impossible had it not been for men of this kind—men who have laid down their lives for the profession. I know that every one of these three might be living today had they not worked so hard to make our paths smooth and pleasant. The pathfinders were they, and in smoothing these paths they have made it possible for us to move along without meeting so many obstacles. Indeed, this is the first meeting of this kind that our association has ever had; never before did we come together and find a condition like this—that three of the noblest men in our profession, those whom we all honored, had passed out of life, at about the same time. Never before did we meet to devote our thoughts and express our love in honor of the memory of three distinguished members. We cannot do too much. The young man, the teacher who is here today, will do well, his future will be the better and the stronger, if he keeps in mind these men and earnestly endeavors to emulate their examples.

REPORT OF COMMISSION ON OPERATIVE TECHNICS.

It has been the aim of our commission to correlate its work as nearly as possible with that of the commission immediately preceding us. With this purpose in view, we again forwarded a copy of the syllabus of minimum requirements to each and every member of the Institute, accompanied by a request that we be informed as to changes made in the Operative Technic course and especially, whether or not, any part of that course still remained below the minimum recommended in the syllabus. Fifty of these letters were forwarded and replies received from but thirty-two; of the thirty-two schools replying, but one was of the opinion that its course in Operative Technics was so nearly identical with the recommendations of the syllabus that further discussion was unnecessary. The remaining thirty-one all report courses similar to those taught last year, a few being considerably in excess of the minimum in all departments, but the vast majority teaching a course which, in the opinion of this commission, is not well balanced, there being a decided tendency to overdo certain departments at the expense

of others. Instrument making is of course, still the chief bone of contention.

The syllabus already referred to was officially adopted by the Institute during last year's meeting in Ann Arbor. We all understand that this is not a legislative body, its purpose being merely to deliberate and recommend; since this syllabus was duly deliberated upon, recommended and adopted by this honorable body, why is it that only 32 out of a possible 50 schools deign to reply at all to our letters of inquiry, while in one case, we are informed that an outline of the Operative Technics course would be entirely superfluous, since it is exactly the same as the one used last year? Does it not indicate that very little, if any attention is being paid The American Institute of Dental Teachers and to the Commission on Operative Technics in particular? To those members who do not look with favor upon the work of this commission, we wish to state that an answer to our queries would be appreciated, even though it be one of adverse criticism.

It is the desire of this commission to recommend that the teacher of Operative Technics who attends the annual meetings of this Institute, as the representative of his school in that department. shall at the next meeting of his faculty, (or as soon thereafter as possible) report what he has seen and learned at the Institute in his particular work. If changes have been recommended in the course, there is no better time or place to discuss it, as it will then be fresh in the minds of all who have attended the meeting. If the teacher of Operative Technics is unable to attend the Institute himself, or if the school has but one representative present, a report of this nature should be made notwithstanding. Until such a course of action has been adopted and rigidly practiced by the schools comprising this Institute, there will be little real benefit derived from laboriously developing and adopting a well balanced course in Operative Technics and then going home and forgetting all about it.

An admittedly feasible plan has been evolved by the commission, its recommendations approved and adopted by the Institute and it now remains for the individual schools to give this matter the attention it so richly deserves.

Respectfully submitted,

W. H. DOHERTY,
J. M. WALLS,
CLYDE H. HEBBLE, Chairman.

DISCUSSION.

Dr. F. W. Frahm, Denver

May I ask what particular advantage Dr. Hebble attaches to the teaching of instrument-making? I think I reported for our school, that we did not do any instrument-making. I did not give any reason why we do not, but would like to ask the other side, why should we make instruments?

In the judgment of the Faculty of our School the time that would have to be devoted to this work could be spent more profitably at other technic procedure without weakening the course.

Dr. Hebble, (Closing the discussion)

I do not refer particularly to any one branch or division of the work, but to a more earnest endeavor on the part of members of this Institute to bring the entire course in *all* departments up to the minimum recommended.

In regard to that branch of the work known as "instrument making," it would please me very much if at the present time the matter could be discussed with a more definite conclusion in view than has been done in the past.

REPORT OF COMMITTEE ON OPERATIVE DENTISTRY AND DENTAL ANATOMY.

Your committee has been assigned the task of preparing a report upon the subjects of Operative Dentistry and Dental Anatomy and their proper treatment in the four-year curriculum. The rapidly increasing demands upon dentistry and the fact that the existing course is entirely too heavy for the time alloted, have long indicated the need for an additional year. The favorable action taken upon this proposition during the past twelve months by both Faculties' Associations, the National Association of Dental Examiners, the National Dental Association, the Dental Educational Council, as well as State legislation such as that of Pennsylvania, insures the adoption of the advanced course in 1917.

Besides providing a broader foundation in the so-called fundamental subjects of the dental curriculum, such as chemistry, histology, anatomy, physiology, and pathology, it will be possible to include substantial courses in biology and physics, and afford a much needed extension of time for the special dental subjects, such as those to be considered in this report.

The concensus of opinion expressed by our leading educators is that the four-year dental course should cover forty-eight hundred

(4800) hours of work in school, exclusive of home study. Of this amount your committee recommends that fourteen hundred and eight (1408) hours be devoted to Dental Anatomy and Operative Dentistry, including Operative Technics, as follows:

	Lectures Hours	Lab'y & Clinic Hours	Total Hours
Dental Anatomy Freshman year	32	96	128
Operative Dentistry Sophomore year	32	192 L.	
Junior year	32	192 L. 160 C.	
Senior year	32	640 C.	1280

In order that the proper correlation of these subjects with the remainder of the curriculum may be more clear, your committee would submit the following as a tentative schedule of the proposed course of study:

FRESHMAN YEAR	Lecture Hours	Lab'y Hours	Total Hours	
Physics	96	96	192	
Chemistry	64	192	256	
Biology	96	96	192	
Technical Drawing		96	96	
Dental Anatomy	32	96	128	
Prosthesis	32	192	224	1088
SOPHOMORE YEAR				
Prosthesis	32	192	224	
Anatomy	64	160	224	
Physiology	64	64	128	
Histology	32	96	128	
Organic Chemistry and Metallurgy	32	96	128	
Operative Dentistry	32	192	224	
Materia Medica	32		32	1088
JUNIOR YEAR				
Prosthesis		64	64	
Public Speaking	32		32	
Surgery	16		16	
Pathology	32	32	64	
Operative Dentistry	32	352	384	
Dental Pathology	32	96	128	
Dental Medicine	32	32	64	
Crown and Bridge	32	256	288	
Orthodontia	32	32	64	
Ceramics	32	32	64	
Bacteriology	32	32	64	
Oral Hygiene	16	32	48	1280
SENIOR YEAR				
Prosthesis		96	96	
Public Speaking	64		64	
Operative Dentistry	32	640	672	
Anesthesia	32	32	64	
Oral Surgery	32	96	128	
Crown and Bridge		192	192	
Orthodontia		32	32	
Radiology	16	32	48	
Therapeutics	32		32	
History, Ethics, Economics, Jurisprudence	16		16	1344
				4800

The study of college physics, chemistry, and biology in the first year will give the student a preparation that will undoubtedly overcome much of the existing difficulty in acquiring an adequate knowledge of anatomy, histology, physiology, and pathology.

By this schedule anatomy, histology, physiology, organic chemistry and metallurgy are completed in the sophomore year. This arrangement permits of sufficient concentration upon these fundamental subjects (which is pedagogically desirable), and also makes it possible for the student to take a State Board examination at the end of the second year in all of these subjects. This arrangement will overcome one of the greatest problems in dental education.

Dental anatomy, technical drawing, and about half of the course in prosthesis should be taught in the freshman year, in order that the student may learn to think in dental terms and begin early to develop finger dexterity.

Inasmuch as physics, biology, and much of chemistry must also be taught in the freshman year, operative dentistry proper cannot be taken up until the sophomore year. During this year and half of the junior year, a very thorough technic course should be given. In the latter half of the junior year the student should operate in the Infirmary, and during the senior year fully twenty (20) hours per week should be devoted to clinical operative dentistry.

Heretofore the work in the technic course and in the infirmary has been of necessity restricted to a few of the most necessary methods of procedure. With the additional time provided in the new course, every method of approved value can receive proper attention.

The course in dental anatomy will not require much amplification, as it is already quite admirably taught in most schools, and such enlargement of the subject as may be considered advisable can be provided for in the courses of comparative anatomy, drawing, and dental histology.

The additional time given to operative dentistry will permit enlargement of the amount of subject matter taught, and make possible a much needed intensification of detail in both technique and diagnosis.

The broader fundamental preparation in the science branches, the longer and better drilling in technique, and the extension of time in the dental environment, should produce very great improvement in clinical practice, pathological sense, and diagnostic judgment.

While the purpose of the present report does not call for a syllabus of the subjects under consideration, it seems to your committee that it would be an excellent thing if the Institute were to appoint committees to prepare a complete syllabus of each subject to be included in the four year curriculum.

E. A. JOHNSON,
H. W. MORGAN,
H. E. FRIESELL, Chairman.

DISCUSSION.

Dr. Daniel H. Squire, Buffalo

I feel a little embarrassed because of the prominence with which the college I have the honor to represent, was mentioned this morning, as being unfavorable to the cultured man. And I think I ought to make an explanation as to the specific instance cited. In the first place, it was said that an institution ought to know more about the men whom they matriculate. Fifteen years ago I think most any of the deans of dental colleges would have accepted a man who had a diploma from the University of Heidelburg. The incident to which Dr. Brophy referred took place in our infirmary. Dr. Barrett came into the infirmary while this man in question was trying to put on a rubber-dam and finally called Dean Barrett to the chair and said, "Doctor, I can't place this rubber-dam." The Doctor looked at it a minute and then remarked, "I think you have worked long enough." "Why?" the man inquired, "Because," Dr. Barrett answered, "this woman is wearing a full upper plate." After this experience Dr. Barrett did say that he wouldn't give a snap for a cultured man as a dental student. But this incident is no criterion to govern the case.

The demand for an extension of the course in dentistry has been in anticipation for a long time, and is the result of an equally urgent demand for a better educated dentist. The condition must be squarely met so that the students may keep apace with the advancement of his profession.

Research is constantly establishing a more intimate relationship between dentistry and bodily health. This means that the course of study must necessarily change, it must be broader, the student must have a larger view of those basic principles of medicine, which will enable him to understand more fully the pathologic changes which take place in the body. He must develop a better

reasoning power. He needs to think for himself, and to stand upon his own conclusions, independent of the medical man.

There is great danger of going to extremes in a desire to make the course of instruction an ideal one. We cannot teach an ideal course in four years, so let us be reasonable and not take up this valuable time in teaching accessories. Let us make the curriculum meet the needs of the dental student and be sure that we know the requirement. It is not wise nor prudent to advocate the teaching of a single subject which could be or should be taught in a high school course. While collateral study gives poise and polish to the young graduate, it does not give to him that degree of efficiency which he would have, if the time had been employed in the study of the fundamental principles of medicine, or in perfecting himself in the technique of dental practice in the infirmary.

It is advocated in the report on the tentative four-year curriculum, that among other subjects the following should be taught in the freshman year: physics, biology, technical drawing, and later on in the course, public speaking. In conversation with principals of high schools, I am informed that these same subjects are taught as per their schedule:

Physics, 5 hour periods a week with 50 experiments.
Biology, 5 hour periods a week.
Technical Drawing, 3 hour periods a week.
Public Speaking, 5 hour periods a week.
Elementary Chemistry, 5 hour periods a week with 5 hour periods in laboratory work.

Under these circumstances, it would seem that considering the amount of time which has already been spent in the study of these subjects, that it would be sufficient for our needs to teach only advanced physics, which had direct bearing upon the principles involved in dentistry, and a course in biology of recitation and laboratory work combined of 64 hours.

If the high school courses are not quite up to the standard, they could be improved by instituting a pre-dental course, leading to dental studies; or we may go a step further and compel the student to matriculate in the department of Arts and Sciences and obtain one year of specific training before entering upon the study of dentistry. I think that this plan, which would then lead to either a medical or a dental college entrance, in many of the colleges, is the real object of our efforts, and it would raise the intellectual plane of dentistry sufficiently.

I cannot agree with those who believe that in the four-year course, that we do not need to use a part of the extra time in perfecting the technique of our students at the chair. I believe that less than 20% of our graduates are really capable of measuring up to the standards of every day office practice. You will probably say that something must be the matter with Buffalo, but if you will carefully analyze your own schools, you will see that the disease is contagious, and approaching an epidemic.

I do not think that we should take a student's time and money to review any part of his high school work, and it is not the goal for which we are striving. The earlier a student finishes an adequate training in the technique laboratory and enters the infirmary, the greater opportunity is offered to him to treat all phases of disease of dental origin and to improve his technical skill. Therefore I believe that operative dentistry should be taught in the freshman year. I hardly see the wisdom of increasing the hours of study without giving further consideration to this most important dental subject. I refer to a well balanced curriculum.

The freshman schedule should be filled to the brim, so to speak, with good hard work. This is the year in which to ascertain the caliber of the men and to weed out the undesirable ones. The sophomore year should be equally hard because of the concentration method of study employed to complete certain subjects at the end of this year.

We have found it of great help in Buffalo, if you will pardon the reference, to insist upon the schedule of work being completed in a given length of time, each week for instance, and if the class is shown that this work must be finished or the student dropped from the role, the work will be done promptly, and loafing in the laboratory—the greatest handicap in student life—is effectively stopped.

I am in favor of a term of thirty-four weeks of five and a half days each week, containing eight hours of working periods, and also of increasing the time in the teaching of operative dentistry, and decreasing the time of teaching dental anatomy, as set forth in the report, as follows:

	LECTURE	LABORATORY
Freshman year, dental anatomy.....	32	40
Freshman year, operative dentistry..	64	280
Sophomore year, operative dentistry..	32	96
Junior year, operative dentistry.....	32	600
Senior year, operative dentistry.....	32	900

I am in favor of a complete syllabus of dental instruction being prepared by the Institute as recommended in the report.

In closing I am not unmindful of the efficient work of this committee, neither am I trying in any way to belittle their efforts. I am only arguing for two things, which I feel are paramount, (*a*) to build a broader foundation upon the bulwarks of medicine, and (*b*) to increase the efficiency of the student in all branches of dental practice.

Dr. D. M. Gallie, Chicago

It is with poor grace that I apologize for not having my discussion of this report prepared. I have been away from home for a week, and was not able to read the report presented by Dr. Friesell until I arrived at Minneapolis. All day yesterday I was busy with affairs over which I had no control, consequently was unable to arrange for a written discussion, and any report that deals in figures and hours such as this report presents can only be properly discussed by giving the subject study and having something written so that the data can be accurate. Then, again, being third on the program I expected Dr. Tileston would be here, and as he was to be followed by Dr. Squire I was afraid if I did write this matter out it might be the question of a thrice told tale. So my discussion will be brief.

On the second page of the report, Dr. Friesell goes into the correlation of the subjects of operative dentistry and dental anatomy, with all the other subjects that will be taken up during the four years. It seems to me that every report that will be presented during the next three days will deal in about the same manner with this subject and we will be talking this same thing for three days. I have in my hand the report just read by Dr. Friesell, and there are only two or three other schools that have issued a tentative curriculum. I have that of the Northwestern University Dental School and of the College of Dentistry, University of Minnesota, also the one presented by our President this morning and the requirements of the Board of Regents of the State of New York. The latter have arranged these different years in a way that they consider would be presenting the subjects in the best manner and correlated in the most advantageous way. And yet I find in these four or five different reports and curricula a considerable difference in opinion as to how these subjects shall be handled and when.

Now, I think we all agree that we can improve in the department of operative dentistry, although there never was a time in the past when we had reached the point of excellence in reparative

dentistry that we have today. We see evidences of this all around us. We believe that we are teaching and have been teaching during the three years, good practical dentistry, operative and prosthetic, and yet there is no doubt we can make excellent use of a part of this extra year by giving students more technic so when they do go into the infirmary they will be in better shape to make practical application of the theory and instruction received in lecture room and laboratory. Therefore I think we should devote some of this extra year to giving advanced technic, for undoubtedly students would be benefited greatly by it.

But it is not so much the question of reparative dentistry that we must consider, but preventive; not only the question of saving tooth tissue, but preventing disease. So we must get down to the sciences, to the fundamental branches. We have this great question of prevention involving so much and requiring such a tremendous amount of extra study which will in a measure be new to the teacher and will be new for the dental student, and the present requirements for admission will make it harder for the dental than for the medical matriculant, because the entrance requirements for the medical student is higher than that required of a dental student. Consequently I think the extra time should be largely devoted to giving our boys and girls better education along the lines of chemistry, physics, biology and physiology and such subjects as are so necessary for a better understanding of the work which is to follow, thus making it possible for us to check the terrible ravages of dental disease. Therefore I may say that we will not have very much time in which to teach public speaking, arithmetic, drawing, and subjects of this kind.

The question as to how these subjects will be taken up and when, will depend somewhat upon the relationship of the dental department of the schools with the other departments of the university or college with which it is connected. In this city (Minneapolis) the dental college is right on the campus with the medical department, and many other schools have that advantage. But some colleges have not this close relation with the medical department, and still others have not a university connection. And for these there will be further difficulty in arranging the curriculum and having the subjects so correlated as to be to the best advantage of their students. Some have a direct connection with the university, which may not be near the dental department, as in our case. The parent organization is 165 miles distant from the dental department, the university being down state in a small town and the dental

school in Chicago because of the great clinical advantages to be obtained in that city. For this reason we may have to arrange our course a little differently from that of some of the schools, we have considered the question of our freshmen taking their first year at Urbana. And this first year will consist of English, biology, chemistry and physics. These are major subjects and the students will have no time to take anything else because they must take these in the same way as the freshmen going into engineering, agriculture, or administrative course, and consequently our university cannot arrange a special course to provide some hours for dental anatomy or the more elementary operative or prosthetic work.

In presenting suggestions in regard to the work for the fourth year (and I will only speak of this phase, not discuss it), Dr. Friesell has here prosthesis, public speaking, operative dentistry, etc., but there are no lecture hours devoted to prosthesis in the fourth year. There is a great deal to the subject of prosthetic dentistry, and there are many different phases of it. The fourth year will be the year in which the students are doing their best work and the greatest amount of work. And while during the sophomore and junior years we have taught principles and they have received their laboratory and technic work, yet I believe there are times when the head of the department or his chief associate or whoever has charge of these students, will see in the infirmary or laboratory conditions that can be remedied only by bringing before the whole class what he has seen. And so clinical operative dentistry and clinical prosthetic dentistry should be taught from the lecture side in the fourth year—I think it is very, very essential. Even in the existing three-year course I find that I am compelled to talk much on what I have seen in the infirmary, each department head in our school being in the infirmary for a half day each week.

I am sorry I have not had opportunity to study this report and present a better discussion, but I know the discussion as a whole will be similar to that offered on many of the reports, and therefore in spite of the fact that I have been negligent, I believe the whole subject will be thoroughly and completely covered.

Dr. A. R. Starr, New York

I thought you might like to know how those from New York City feel in regard to this matter. I will say that the remarks of Dr. Squire express very clearly the views which the members of the Faculty of the New York College of Dentistry entertain in regard to this subject. We feel that we should have

a higher standard of preliminary education, that the students should obtain in their high school or college education enough of the elementary branches of science so that we will not have to elaborate upon them in the dental course. We realize the necessity for a knowledge of those elementary branches and realize that some students have not had the advantages they should have had in those departments; but we aim to teach these subjects (as far as we do teach them) chiefly in relation to their application to dentistry.

In regard to the elementary dental branches, we feel that our students should be taught these subjects throughout the entire course beginning in the first year. We expect, as most of you do, to begin the four-year course in 1917, and in the final year we hope to be able to elaborate more upon the clinical features of operative and prosthetic dentistry, devoting more time to them in that year than to the elementary subjects. We hope to be able to secure legislative action in the near future which will enable students to take license examinations upon the fundamental medical subjects after the close of the second year. If that can be done it will greatly facilitate the work of the four-year course as now contemplated.

Dr. W. S. Russell, New York

I would like to add to what Dr. Starr has said. During the present winter a bill will be introduced into the New York Legislature which will allow our students to take, at the end of the sophomore year, the final examinations in anatomy, chemistry, materia medica and histology. After these subjects have been passed the student will devote the remainder of the course to the purely dental subjects. We feel that the student should come to us fully prepared in all of the fundamental subjects, especially must he know English. With this end in view, we allow no student to enter the college unless he presents the Qualifying Dental Student's Certificate of the State of New York. The law allows us to matriculate a student with 45 counts, but we feel that the man who comes with the slight preliminary knowledge represented by the 45 counts is badly handicapped for he must make up the remainder of the 60 counts before the beginning of the second year and this prevents him doing his best work in the college. We believe, that with this knowledge, he will be able to take up the dental course intelligently—if later we find he cannot go on with the course he is dropped at the end of the first year. We refused

between 125 and 150 students the present session because they had not obtained the certificate, in spite of the fact that they had the 45 counts required by law.

Dr. Henry W. Morgan, Nashville As a member of the commission I have agreed to put my name to the report with the distinct understanding that this is a tentative outline drawn up for the purpose of giving us another point of view from which we may all work in adjusting our courses to the additional year that we purpose to begin with the session of 1917-18. I think I could better discuss some of the remarks made this morning and some of the observations of one of the gentlemen who led in the discussion, and perhaps make myself a little clearer.

I have been very much surprised, but gratified, to find the opinion so unanimous that the young men who come to us from the preparatory and high schools are not as fully equipped, are not as highly educated, as they should be. Now, do not misunderstand me when I say that this is an arraignment of our educational system and *not* an arraignment of the dental college. The claim is that the men who come to us are not drilled in rhetoric, logic, spelling, construction, expression and argumentation; that they have not had in the preparatory schools the proper training in certain fundamentals that go to class one as educated. Then why not lay the ax at the tree where it belongs, instead of undertaking, in our medical and dental courses to correct them? Why is it that the states, which have made such wonderful advances and have such an immense amount of machinery for the supervision of education, have not done their duty if these charges are true?

As regards the four-year course outlined, I am not one of those who believe that when you send the young men to the liberal arts department to get their first year's training, you have added one day to their dental course. That is not dental training. That may be helpful to them, but you are not going to make a better dentist until you have given more time to dental subjects. I believe as firmly as any of you that we ought to give more time, but until we have secured what Dr. Arthur Black has furnished the Northwestern (detailed outline of work), and the amount to be taught sufficiently laid out as suggested by the final clause of the report; until a syllabus of each subject has been provided, and what should be taught fully determined, in other words, until

we get ready to say "what" and "where" and "how much" shall be taught we cannot know how much time it is going to take.

In the suggested curriculum there is a certain amount of time set apart for biology. If I were to criticise this item I would say that too much time is given to lectures and not enough to laboratory work. I believe we should add to our laboratory courses, and that in the first year we ought to give far more of technic than is proposed in the report. But we offer this merely as a suggestion with the understanding that each will make from it such selection as seems fit and on that build up our curriculum.

It has been suggested that it is impossible for us to have a uniform curriculum—uniform as to "time" and "place" in the "course" and "how much" is to be done—all I think agree to this. But there is a limitation to human mind. Sixty-four hours in one year *is not* enough time for general anatomy. We talk about laying the foundation deeply and broadly in the fundamentals of dentistry which are the fundamentals in medicine, but we cannot do it when we cut down general anatomy to sixty-four. One hundred and sixty-eight hours are not considered enough by some of us, and when we cut it to one year and only 64 hours I submit that we are not broadened very much.

Just one word further. I was sorry Dr. Friesell did not amplify the requirement, "public speaking." I showed that report to one of my colleagues and asked him what he thought about it, and he said, "Public speaking?—what has the dental college got to do with public speaking? I never yet saw a dentist who could talk that could do anything." Dr. Friesell has explained to me that he does not mean "public speaking," but does mean what some universities call "English No. 7." And I am sorry he did not make this more clear when he spoke of it.

Dr. E. A. Johnson, Boston

As member of the committee that drew up this report I haven't anything to add except possibly an explanation. I am very glad our friend Dr. Morgan brought up and explained the matter of public speaking a little more fully. That has seemed to be the stumbling-block of the whole curriculum, and it brings a smile to the face of every one when they see "public speaking." Public speaking in this instance covers a multitude of sins. It is a lamentable fact, and I think every man who has ever taught dental students will bear me out, when I say, that

a very small percentage of the students are able to write the English language comprehensively, that is, write it as it should be to express the ideas they wish to convey. That subject of public speaking is to introduce a course, call it rhetoric, English, whatever you wish, broad enough to give the student a training whereby he may produce ideas for argument, or publication, from books or what he has learned, and present them in an intelligent manner.

Another course about which I would like to say just a word, is one giving the student training while in college in the art of maintaining and running his office in a professional and business-like way. Not necessarily in a business way whereby he may be able to double his income, but in a way whereby he may be in a professional and dignified manner, serve the public in the most practical as well as ethical way, and receive proper remuneration, and in a way that he may be able to determine whether or not he is practising his profession in the most efficient manner.

I think that any curriculum that is adopted, would have to be taken by each school and adapted to its needs, because the courses of some of the university dental schools will have to be made to coincide with those of the medical school, in which event changes would probably be desirable.

I do not think that courses in chemistry and biology as they should be taught to a dental student can be obtained in a regular academic course. The course that should be taught in biology and physics ought to be so arranged as to better prepare him for his future course in anatomy, histology, etc.

Dr. Arthur B. Crane, Washington

Shortly before leaving Washington I had a conversation with a dental examiner who has examined men for license to practice coming from very many of the schools which you gentlemen here have the honor and pleasure to represent. He asked me this question: "Why is it that the large majority of the men coming from the dental schools are able to present such creditable papers on the written subjects, and fall down so lamentably when is comes to the production of their practical work?" I suggested to him that perhaps a reading of the editorial which had appeared in a recent number of the Dental Cosmos, relative to "Professors made over Night," might give him some light on that subject.

The man who studies in an average dental school to-day gets his theoretical training from text-books that are written by those who are masters of their subjects. He gets his training in actual mechanical manipulation, in his finger work from men, many of whom I much regret to say, are not trained teachers, and have not completely mastered the subject which they are attempting to teach.

I state that little incident to bring out the fact that in our schools today the men are not receiving sufficient practical training in finger manipulation. If to our course in dentistry we are going to add another year, certainly first of all we want to broaden the course, and we want to amplify the subjects which have not hitherto been given enough attention. I do not believe that during the precious hours of the proposed four-year course we want to try to give a man something that should have been had before he ever came to us. If a man comes deficient in English, reject his application for matriculation and send him back where English should properly be taught. If he comes to us unprepared in any subject which he should have learned before coming to us, reject his application, but do not let us undertake to usurp the duties of the high school and academic department of the university. If we are going to extend the course, let us make better dentists—not litterateurs nor orators, but better dentists. One gentleman has suggested what is practically a course in book-keeping, another a course in English, another public speaking, and so it might go on indefinitely. We might add a course in electricity. We have the ionic method of treatment forced upon us, and that makes a knowledge of electricity very necessary. We have possibly more need to teach medical Latin and Greek than expression in English, because the latter should be learned before the student comes to us.

Dr. F. B. Noyes
Chicago

It seems to me that there is one thing in this discussion which would relate to the entire four-year course instead of to operative dentistry and dental anatomy alone. Two or three times the speakers have said that if we are to make better dentists, we shall have to spend more time in teaching dentistry and not waste time on English. Will you tell me any way in which you can teach a man, if you have no common means of communicating ideas? So far as I know, language written and spoken is the means of expression. And if a man is incapable of understanding the means of expression or incapable of expressing in language his own thoughts, how are you going to make a better

dentist of him in four years than you did in three, unless you understand by a better dentist a better mechanic? You may make a better mechanic of him, but if you are going to make better dentists in the sense of men that have a better grasp of the fundamental principles of pathology which are at the bottom of dentistry, you have got to teach them some English, you have got to make them able to understand what you say to them and to express their thoughts intelligently. We are face to face with a condition and not a theory. It is very well for us to say that our men ought to come to us equipped in English. Do they? It is a condition, not a theory. Theoretically they should, but if you will go to any college in this country you will find that there is not a single one, although they all require English for admission, that does not require of its freshmen a course in English, because they do not understand the English language well enough to study the subjects that they will have to study in the succeeding four years, or to express themselves in their educational work.

Now, if we are to admit men from the high school, the dental school is face to face with the same proposition. In one institution that I happen to know something about, 65 per cent of the freshman class last fall were required to take a course in rhetoric, which does not count one hour towards their B. A. degree; secondary school work to be sure, but the college was face to face with the proposition that these men were unable either to understand or to express themselves in English, and if they were to go on and do work leading to a college degree they must be taught that in addition to other things. I believe that there exists in our dental schools at the present time a condition as regards English that is identical with that to which I have referred, and this condition will only be eliminated when the professional and college institutions are so transformed that proficiency in English is required before graduation from high school.

Dr. R. W. Bunting, Ann Arbor

In listening to the discussion which has so far taken place, there has been running through my mind a certain thing of which I wish to speak. I do not know whether or not this is the proper time, but we have been talking about the increase of our course from three to four years, and wondering which is the better way to do it—whether we should make the additional year all dental, or whether we should put in our four-year curriculum certain subjects which may be called preparatory.

It seems to me that we can get a parallel from what has been done by the medical profession. How did they increase their course? I do not know how they have done it in all schools, but in Michigan they have increased their course by adding first one year and then two years of almost entirely preparatory literary and scientific training. And what has been the result?

Let me state here a personal condition. Our dental students are taking courses under the same men as are the medical students, and the heads of those departments tell me personally that our students in the same subjects cannot be graded by the same standard as that achieved by the medical students. If they pass a medical student at a grade of 70, they pass our students at a grade of 40 or 50. Why? The only reason I can see is that our students are too young perhaps, too illy prepared, too inexperienced, to grasp the same subjects and same teaching given to the men who have had that preliminary training.

Another illustration that is more concrete:

Dr. Ward, in the treatment of his subject of various operative principles which are under consideration at the present time, is handicapped, and handicapped very seriously, because of the fact that his students do not understand the principles of physics. Each one of them has had a course in physics in high school, but they do not know Physics. And, more than anything else in his course, Dr. Ward wants not more time to teach his course *per se*, but to have those boys come to him with a knowledge of physics. Dr. Patterson has told me that the thing he needs most in his work is not more time to teach pathology, but to have his men come to him grounded in biology.

It seems to me that this time spent on the proper preparation of students in a manner similar to that which the medical men have employed, is not wasted time. We are putting in one or two or three subjects, and every one of us looks at this from a different angle and viewpoint depending upon our own home environment and the conditions under which we work. But personally to me, and I believe to our faculty, the thing to be most desired is not more time in which to teach dentistry, but we wish we had men coming to us with two full years selected academic training similar to that which the medical schools require, under which conditions we could make better dentists of our students than we are now doing. I do not say this to controvert anything that previously has

been stated, but give it simply as a personal view and one that I believe is concurred in by the men in our school.

Dr. Friesell
(Closing the discussion)

It certainly cannot be said of this organization that it is a dead one, when it takes so little to get a rise out of it.

We are not discussing the merits of the four-year course—we have passed favorably on that question and adopted it. It is simply a matter of orientation. So far as the dental course is concerned, and more especially that part of it which we call operative dentistry and dental anatomy, your executive committee has concluded we are preparing for a four-year course, and we had better find out what is the best thing to do. We all have our ideas of the matter. Let somebody propose a tentative outline of these various subjects as a starting point, when we will be enabled to compare ideas and arrive at a reasonably satisfactory conclusion. That is all this report was intended to present. We recognize all of these defects in dental education, whether it be the three-year or the four-year class. The difficulty is that some of us differ widely in locating the cause. You have your ideas in regard to the cause and you have your ideas in regard to the method that will best enable *you* in your particular environment to overcome that cause and produce the best type of dental graduate. I have mine.

Last June representatives of eleven universities of this country met in Chicago, not only representatives of the dental schools, but heads of the universities, and discussed this subject quite thoroughly. The basis of the amount of time that could be reasonably expended for application in the four-year dental course, and whether wise to take it up, was reviewed, and 4800 hours was accepted as the maximum of time in school, and I think 4200 hours of the subjects as presented there were unanimously approved, and 600 hours left for variation in choice of ancillary subjects and the time of application. We find accordingly about eighty-five per cent uniformity on the four-year course even in the tentative program.

If the speaker had the diction of a Kirk, the eloquence of a Thornton, the super-six-cylinder tongue of our friend Gallie, and the ideas and wisdom of each of you, he might be able to convey what the commission means by the course in public speaking. If he were able to do that, the presentation that he would make of the subject would be so clear and so satisfactory that you would all agree that public speaking was the most important subject in the four-year curriculum.

REPORT OF THE COMMITTEE ON PROSTHETIC DENTISTRY, ORTHODONTIA, CROWN AND BRIDGE WORK.

When asked to make this report I was not informed as to what I was to report on, and, unfortunately the report does not comprise what it properly should have done, and that is the findings of the committee as an entirety. Unfortunately it is more or less a personal report and will be a brief review of the subjects assigned to me. But in it I have not made a claim for all of the time that has been assigned to the four-year curriculum.

In making my report as Chairman of the committee I will consider the subjects assigned to this section under two rather than three headings, since crown and bridge work is purely prosthetic dentistry.

Before taking up the discussion of curriculum I desire to call your attention to a few things to which we, as teachers, must give serious consideration or our efforts will not be fully rewarded.

First of all the student of to-day is not sufficiently interested in prosthetic dentistry. The question then for us is the cause, the effect and the remedy. There are several causes. Primarily most students are not natural mechanics and as a consequence the work is uninteresting and laborious; then some times our methods of teaching may be at fault and we may not emphasize the importance of the subject as much as we should. Then again the influence of the dental laboratory.

The first and last mentioned are in my opinion the most common causes of lack of interest. The student who has not a natural liking for mechanics will not put his heart into his prosthetic work, and while this is more or less true of all departments of dentistry it is more particularly true of prosthetics.

The dental laboratory in some respects is possibly a good thing, but in the main I believe that it is exerting a very damaging influence upon the prosthetic student and prosthetic practice in general. The effect of this lack of interest is at once apparent and needs no elaboration for an audience of teachers.

The remedy I shall leave open for discussion. Suffice to say that in view of the fact more and better prosthetic dentistry is demanded to-day than ever before, it becomes our duty to see that this demand is properly met.

Now that we are adding another year to our course, we should endeavor to make good use of the additional time. I believe that the prosthetic department will most benefit by this additional year. Surely no other department requires as much time for the proper training of a student.

We believe then that prosthetic dentistry in some form should be taught throughout the entire four years.

Our recommendations are as follows: For the freshman year thirty-two (32) hour lectures and 368 hours prosthetic technic. In the sophomore year crown and bridge work 64 lectures and 292 hours technic. Junior year 32 hour lectures, 128 hour technics in anatomical occlusion, removable cases, cleft palate, obturators, etc. Senior year 64 hour lectures and 1000 hours in laboratory or clinic divided between operative and prosthetic dentistry as the occasion demands. We believe that the student should have some strictly dental work for the first year, and after careful study we find artificial denture technics the best suited to the freshman. With a year of training in this coarser work the student will be better prepared to do the crown and bridge, operative and orthodontia technic.

During the freshman year we propose to give in addition to the technic work 32 lectures. These lectures to be confined to history, materials, instruments, nomenclature, technic procedures, etc., not considering the practical application at all.

With this entire year of digital training in this department of prosthetics, and his mental training in the other subjects, we have our student well prepared for the work of the sophomore year such as operative, crown and bridge and orthodontia, which require more minutia of technic.

In the Sophomore year 64 hour lectures and 292 hours technic will be devoted to fixed crown and bridgework, and 32 hour lectures and 64 hours technic to orthodontia.

Thirty-two of the lectures in crown and bridge will be on theory and technic, and 32 on the practical application.

In the Junior year 64 hour lectures and 128 hours technic on anatomical occlusion and removable appliances, cleft palate obturators, etc., also 400 hours clinic and 32 lecture hours in orthodontia.

The Senior year will be occupied with 64 hour lectures and 1000 hours divided between operative and prosthetic in laboratory or clinic, and 32 lectures and 64 clinic hours in orthodontia. In

addition to this work the senior is required to make study casts, write up history and make up models in duplicate of all removable appliances, describing fully the conditions in the mouth, form of appliance and materials employed, etc. By this plan the student is taught to make a diagnosis of the case and to discriminate between the various means of supplying these cases—at the same time the duplicate models with their accompanying data filed with college make a very valuable collection which may be studied by each member of the class as well as the classes to follow.

For teaching all technic I want to emphasize the importance of display cases showing each step in detail, arranged and placed so that students may refer to them as they progress with their work.

Underneath each piece is a card describing the step and numbered to correspond with card of instruction which is given each student when he starts each step. The value of these silent demonstrations cannot be over estimated.

This report is submitted as a brief outline of the curriculum for the four-year course as contemplated by the Chicago College of Dental Surgery and is only tentative.

If this outline with the few accompanying suggestions brings out a free discussion it will have served its purpose, and with this idea in view, I submit it for your consideration.

F. E. ROACH, Chairman.

DISCUSSION.

Dr. S. W. Bowles, Washington

Through miscarriage of mail I did not know until yesterday while in Chicago that I was to discuss this report, and I saw just before coming into the room, consequently I cannot give a formal discussion. I can only take up the feature of the remedy which Dr. Roach referred to—the remedy for the apparent lack of interest in this subject among our students.

Dr. Roach first said he thought this lack of interest was because students generally are poor mechanics. My remedy for the correction of this condition (and it certainly is quite prevalent) would be to put in the entrance requirements some form of manual training. Just how that could be done I do not know, except that it seems to me we should select students perhaps from technical high schools

for our matriculants. That would also, I believe, help to remedy the point that was discussed this morning—we could very soon get a line on the mechanical ability of the student.

The next point, lack of interest, it seems to me is up to the teacher. He should in his personality and enthusiasm for his subject, instil the interest into the student. This may very easily be done by pointing out the importance of the subject and the fact that it is growing every day.

In the knowledge we have of the relation of mouth conditions to systemic conditions and the resulting necessity of removing teeth, we can point out not the growing importance, but the importance which always has pertained in the making of perfect substitutes, emphasizing that they must be mechanically and hygienically and artistically perfect. I think it is not exaggerating at all to say that it requires every particle of skill the student has to make a well rounded, perfect prosthetic piece. If the teacher will instil this into the student early and will continue to do so, with reference from the other chairs at the proper time, I see no reason why the student cannot have interest in this subject created and maintained.

That brings up the other point, the dental laboratory. If there is any one present who does not realize the pernicious effect, and the constantly increasing pernicious effect, of the commercial dental laboratories, he has but to visit any of the large cities. From a superficial viewpoint I happen to be familiar with the condition in New York City. I visited there twice to obtain a mechanical or laboratory man, and I was told that I could get a man perfectly equipped along this line at a certain school where mechanical dentists were being trained. I was surprised to find two or three well equipped schools with from 135 to 160 students learning to be mechanical dentists. It seemed to me that these schools were run in connection with laboratories and that the work which came to them from the profession was done by their students. There might have been a scientific dentist in charge of those men, but I did not see him. The students are simply taught the mechanical side; they are not taught much, if any, dental anatomy or any of the subjects that would enable them to reproduce an anatomically, correctly made artificial denture.

So if we can instil into the students the growing importance of this subject, I think that will be the first step towards doing away with the commercial laboratory. I believe our students feel

that they do not need to do as much prosthetic as operative dentistry, for example, because they can send their work to these laboratories.

I repeat, then, that it is up to the teachers to create the proper interest in this subject. I thoroughly agree with Dr. Roach that prosthetic dentistry instruction should continue,—that there should be some prosthetic instruction in each year of the four-year course. I was particularly pleased to have him place the plate construction, or, as he called it, the coarser technic work, in the freshman year. I believe that this work does more than simply prepare the student for the finer technic that comes later. It gives him finger training and furnishes preparation for all his work in this line throughout the entire course.

If Dr. Roach mentioned it,—I did not hear what he recommended for a course of orthodontia. At our school we have gone on the principle that under the present conditions it is not possible to teach orthodontia as it should be taught. We simply teach the principles of orthodontia. I mean by this occlusion, mal-occlusion, the classification, and the technic of making appliances. We do not attempt to teach students the treatment of cases, nor do we even attempt to carry a case through to the infirmary. We might be criticized for that, but, as stated, we feel that we could not teach the subject thoroughly and properly, and I was rather in hope that Dr. Roach would make some statement as to what he would propose to do in the course. In other words, if he would try to cover the whole subject in the extended course, or still leave it for the special student who wished to particularly follow this line of work.

Dr. G. W. Dittmar, Chicago

Coming third on the program, I, like some of the other third-number speakers, have not prepared a discussion. I did not know what was in the report to be presented by Dr. Roach until about ten or fifteen minutes before he read it, when I glanced it over. Furthermore, the remarks made by Dr. Bowles cover to a great extent the important points taken up by Dr. Roach, therefore I will, with permission of the chair, discuss the report from a broader standpoint.

In regard to the discussion that has taken place this afternoon in consideration of report on operative work and which also applies to an extent to the prosthetic report just given, I would like to second the remarks that were made by Dr. Bunting. The remarks he made apply to the position we take, and that position was defined

quite clearly by Dr. Gallie when he said that so far as our department (the University of Illinois) is concerned, the parent institution is situated 165 miles from the dental department. Consequently we as a faculty have decided and recommended to President James that our students of the first year shall take their first year at Urbana. We have decided and recommended that they take English, biology, chemistry and physics, believing that a student well prepared with these underlying subjects, will come to us and be fitted so that we in three years can teach him the purely dental and allied subjects to the best advantage.

As I have listened to the discussions and observed the various angles taken by the different speakers, the whole subject seems to be in a chaotic state. I do not know what to say, and I am sure the majority of us hardly know "where we are at." It will take time to sift the matter and find out which is the best, and then possibly what is best for you would not be best for us because of the varying conditions. So I question whether we will ever agree, and yet it does seem that there are certain principles that all will have to observe and from which we cannot part to any great extent.

In the taking up of these four fundamentals, which is as much as our university will allow in a year, we include no dentistry. We do not discuss the subject of dentistry as such, but in this connection I would like to submit what Dr. Gallie said, that it is the intention, as I understand it, that the teachers, who instruct our students, shall direct their chemistry and their physics to apply more in particular to what dentists will need. That much perhaps the courses will be changed. English, of course, is English, and biology is biology, but the other two subjects, chemistry and physics, can be modified to an extent to apply more in particular to the needs of a dental student.

Regarding the time suggested in the report as applied to prosthetic dentistry, while I have always maintained and still believe that we cannot give a dental student too much technical training, yet I think that in this course as outlined by Dr. Roach too much time is given to lecture work. While lectures are important, I believe that as a rule we do not teach a student as much by means of lecture work as we sometimes think we do. If we would give more time to the laboratory and to the clinical parts of the course and not so much to lecturing, we probably would get better results. In the outline presented, as I noted it, Dr. Roach has 192 hours devoted to lecture work; 32 in the freshman year, 64 in the sophomore year, 32 in the junior year, and 64 in the senior year. Of laboratory work

which he gave, although we will concede that out of this thousand hours of clinical work only half of it is devoted to prosthetic work, there are 1288 hours, which with 192 hours of lectures would make 1480 hours given to the one subject of prosthetic dentistry.

In the report given this morning, about 4800 hours were suggested for the four-year course. If we compare the figures given in these two reports, we see at once that as prosthetic teachers we would be monopolizing too much of the course—too much time given to prosthetic dentistry. Nevertheless I believe that we need a great deal of time, but it seems to me that it would be an unbalanced course if we were to give as much time to prosthetic dentistry alone as Dr. Roach suggested and divide the balance among all the other subjects that are to be included in the four-year course.

Dr. Alfred Owre, Minneapolis

It is desirable to analyze a little bit the status of the dental profession at the present time, before we plunge into discussion of this curriculum. Dentistry should also be discussed historically. What *was* our status, and what can be learned from the past that will help us in shaping our course in the future?

It seems to me that in ancient times our status was higher than it is at present. We learn that at the great courts of the world there were formerly dental specialists who had evidently had the same training as the men who practiced other specialties in medicine; that standard was maintained for a very long time. It was when the commercial system, the competitive system, the industrial system, took hold of the world, that we became separated from the ancient and noble profession of medicine. We wanted a "short-cut," to get out into the world and compete; the result has been a degeneration in dentistry rather than a regeneration. It is asked sometimes, Is this degeneration inevitable? Of course, sometimes not. It depends upon the extent to which the nation in question has grasped the communal idea; upon the real greatness of the nation. A nation is great if its people have an appreciation for beauty and maintain a high ethical standard. If the central stream of that nation's life is so inspired, you may have a constant regeneration in every phase of life, or in other words a tendency towards the perfect edifice; here the disaster is not necessary. As an illustration I would call attention to the ancient civilization of Greece, where there was a leaven at work which continually tended to perfect the edifice; where the word *perfect* was just another word for *efficiency*.

This leaven was continually eliminating the base, and substituting for that nobility of soul. Furthermore, that leaven worked to perfect every phase of the art of living, building up the community spirit. With such a background, you can appeal to a people for higher ideals in any calling or in any matter that concerns the welfare of the community.

What is our status in this particular part of America? Just a glance at the situation convinces us that materialism holds sway. Call it competition or commercialism or what not this system is the governing body. When some years ago the charge was made that American dentistry was not what it ought to be, to put it mildly, there were many of our profession who hesitated to assent, yet the charge was levelled, and a great many of us felt that the charge was perfectly true. We hated to acknowledge it openly, and several articles were published in the popular press and in our magazines defending American dentistry. Of course, loyalty calls for that; yet the idealist knew in his heart that we were wrong. Only our instinct of workmanship has kept us alive. It is the mechanic who loves to work; but when the complex machine goes wrong he is not the man who can mend it. Always we have to call in the idealist, the man of vision, for he alone can put it together along lines which make it a perfect machine, a factor in the progress of civilization. Our calling is a humane one; it should fill as great a human need as the sister profession with which it is so intimately associated. It needs mending by the men of vision. And, as I said this morning, the great Macedonian cry came from a man who had perfect technic and who had the vision of what was necessary to be done in medicine—prevention; and he has the vision of what that word efficiency means in any calling.

What must we do to mend the machine? Educate. Education is the gate through which we must enter if we are to perfect our edifice. All of us have noble ideas; we want to do what is right. I am sure of it. And we must try to get as close together as we possibly can under the conditions in which we are working.

Ten years ago I sent out a card to every dentist in this state asking if he would support one year of academic work as a preparatory course in dentistry. Out of 600 dentists addressed 580 replied yes, that should be done. 20 were a little indifferent as to whether it should be another year of dentistry, or, say, a year of prescribed academic study. Then it became the office of our university to make inquiries of educated men, both in this country

and abroad, who make dentistry their specialty, and to study the various technical educational institutions. Ours is a technical calling, not so much different from other technical professions; we can learn a great deal from them.

At the morning session Dr. Friesell went into this question of an extended course. There was a great variety of opinion as to how we could make an efficient man—a master-piece. To produce a master-piece of practical value requires mutual sacrifices. How much shall the idealist yield to what is known as the practical man, and how much shall the practical yield to the idealist? By the practical man I mean the one who does the every-day routine of life; he may have an ideal, but may not have the great vision of the future. He is primarily the worker. We must meet him on his own ground. So we worked on the programs with this fact in mind. The programs were made out not only in this country but in Europe. We discoverd that we can learn a great deal in Europe, where the word *efficiency* has a vital meaning, especially in one section.

It was found that the profession throughout the country was not ready to institute a year of academic work. I want to give a few thunderbolts of truth along with this talk. The materialistic self was opposed to that. A great many schools were dependent upon students' fees for maintenance, and this course, one year of academic study, did not commend itself to these institutions. Yet the necessity for it is pressing. We must remember that the student should be prepared for his life calling early. The need for vocational guidance in preparatory schools has not been met in this country. We must face this condition. As I said this morning, we have some men who have a tendency toward the concrete, and some a tendency toward the abstract. It becomes our duty to test the student fully, first by competitive examination. Then we must have some leeway, in order to economize the student's time. High schools throughout the country vary widely in the preparatory courses offered. We must be able to supplement the student's preparation wherever it is weak. Again we must not allow a student to enter dental college and remain one year, only to find that he is not fitted for dentistry. We must make it possible for him to realize that long before the expiration of a year.

We have further made it possible for the student to feel his way by introducing prosthetic dentistry in the first semester and carrying it through the year. We feel that while giving him work

essential to the practice of dentistry we are also testing him out. If by accident a man has been admitted who is not adapted to the work, by the end of the first semester he should find that his tendency is to some other calling demanding less mechanical skill. Well and good; there is no great economic loss or waste in changing at this point to medicine or engineering or whatever he may choose.

It is not economy to introduce human anatomy before the student has been trained to appreciate that subject. Dentistry calls for accuracy, attention to minutiae. Now we are asking students in the very first year to draw teeth, before he is trained for it. He is asked to execute a piece of work for which he has not had any training. How are we to give him this training under the present system? It is not economy to teach drawing when teaching dental anatomy, as has been suggested, because the anatomist does not necessarily understand the principles of drawing. The student should have special instruction in drawing; the knowledge so gained can later be applied to dentistry.

And now we come to the English phase of the question. Here is where we can learn from other technical schools. The engineering schools of some universities refuse to go on with engineering training until the student is able to express himself in good technical English. It is not enough to have ideas; you must be able to communicate them powerfully and efficiently to your neighbor. We have got to meet this need too, for it is economy. A student is wasting his time writing reports on the heavy subjects in the dental course without knowing how to organize effectively the material he amasses.

In planning the freshman year of the four-year course we have borne these things in mind, in fact, throughout the course. The first illustration is animal biology. It is claimed that this course can be taught in anatomy. I grant it can be, but why not call it by its true name, and teach it in the academic college? Why should the dental college charge a professional fee for animal biology, when the academic college already has facilities for teaching it? I have never yet met a teacher in anatomy who did not advocate a preliminary course in biology. If the student has had animal biology, it is not necessary to increase the hours for human anatomy. He is prepared to appreciate it. He is also better prepared for physiology after having had this fundamental course in animal biology.

This arrangement of course in their logical sequence has been followed to the end. In the first semester of the sophomore year

we have organic chemistry, following general and qualitative chemistry of the freshman year, prepared the student very well for the subject of physiology in the second semester. It also prepares him for the subjects that follow; all subjects, in fact, are in logical sequence.

We have distributed medical subjects practically over the entire course, at the same time allowing ample time for technic and practice. We have something like 192 hours in the first semester of the junior year for practice, 480 hours in the second semester, and 576 hours in the first and second semesters respectively of the senior year. So this phase is not neglected.

Dr. Brophy: How many lecture hours do you devote to operative dentistry in the four years?

Dr. Owre: There are 48 assigned lectures for the entire class. But that is not all, because in the technic course the men are divided into three sections and as many lectures as are necessary are given in connection with that work.

Dr. Brophy: How many lectures in chemistry?

Dr. Owre: Two a week are given in the six-credit course, and the balance of the hours are devoted to laboratory work.

Another important thing: We have felt all the time, in collaborating with all the men we could reach in this country, that we must have a certain amount of leeway in working out our local problems. And for that reason I think, at the meeting held in Chicago upon the invitation of President James of the University of Illinois, we passed the general resolution that 4200 hours should be devoted to so-called strictly dental subjects, and 600 hours to the ancillary subjects.

Dr. Martin Dewey, Kansas City

In taking up the report of this committee, I would like to begin by asking a question: Why is the department of orthodontia placed under the chair of prosthetic dentistry? Orthodontia has no more business under the chair of prosthetic dentistry than oral surgery has.

The amount of time that should be devoted to orthodontia and the manner in which it should be taught will, of course, always be a question of vital importance, and one in which probably very few teachers of orthodontia will agree at the present time. You must

remember that there is no subject of dentistry that has evolved so rapidly as has orthodontia in the last ten years. Formerly any one would be given the chair of orthodontia who desired to take it, it used to be passed around and any one was considered well enough versed in the subject to teach that particular branch. But things now have changed and you probably have had that change forced upon you today, and you are made to realize that the subject of orthodontia has grown so large that one school of orthodontia is asking for entrance to this Institute. And yet our committee has considered it of so little importance that they have placed it between prosthetic dentistry and crown and bridge work. But that has nothing to do with the plan of teaching orthodontia, although the subject is given very little room and very little time. As Dr. Bowles has said, it is best to school our students on certain definite principles along orthodontic lines that can be taught. That is probably true, because orthodontia embraces so many things, and, like other dental subjects, must have a limit to the preparation leading up to it.

Dr. Roach spoke about the teaching of anatomical occlusion. To my mind anatomical occlusion (and any kind of occlusion is anatomical occlusion) should be taught under dental anatomy. In other words, it has been my experience in teaching dental and post-graduate students that before we could teach them occlusion as orthodontists understand it, we had to go back and teach them dental anatomy. In the experience which I have had in twelve years of post-graduate work along orthodontic lines, we have had students from practically every school in the United States, students from some of the large universities of which you are so proud, and I must confess that in many cases they know no more about dental anatomy than students coming from the so-called private schools.

Now, I do not believe it will be possible to make every dental student an orthodontist, any more than it will be possible to make every dentist an oral surgeon. I do not believe it is any more possible for every dental student to successfully treat a case of malocclusion, than to successfully treat a case of cleft palate and harelip. Therefore when we reach the question of teaching orthodontia, we are considering a problem which will demand a great deal of discussion and which will require a great amount of time before it is settled. And to my mind it probably will have to be settled by having this Institute realize that orthodontia is too big to still play second fiddle to some other chair.

Dr. A. W. Thornton, Montreal

I might be able to answer the question as to why the subject of orthodontia was put where it is. It was not because it was considered secondary in importance, nor of first importance, in any curriculum; but your executive board was instructed last year to prepare a program about which the meeting of this year would circle. The grouping was simply suggestive, and we had the idea that out of the discussion those who were in attendance would go away with a better idea as to how to construct a curriculum for their own particular school. There will be no standard curriculum adopted by all the schools, and therefore every school will be at liberty to put one hour or one hundred hours upon any subject as they see fit. But we do believe that you are all wise enough to draw your own conclusions in regards to the importance of any subject.

If you will allow me I will make one suggestion which will, I believe, help you in the division of your hours. In the Royal College of Dental Surgeons, Ontario, there was a reconstructive period some years ago, and we said, "We do not care whether you lecture an hour or five hours, or ten minutes; we will give you so many hours in which to teach the subject and you may divide that in any way you see fit so long as you bring about the results." And I think this has worked out very nicely indeed.

We have heard a great deal today about the admission of students to our colleges. But I think we have lost sight of the students as they go out from our colleges. If you will call to mind the condition of dentistry and the condition of many of the dentists in the large cities of the United States and in some parts of Canada, I believe you will not be very proud of the product. We heard today that all dentists should be centers for spiritualizing influences, the fore-runners of a dawn that should take place, with rosy tints of a brighter civilization coming from those educated and high-idealed dentists. Well, as I came through a large city in the United States I saw a rosy hue which I thought possibly might be coming from some higher civilization, but as I got closer I noticed that the tints were coming from an illuminated sign of "peerless and painless dentistry."

There is another thing we have lost sight of: We are educating men to go out and give service to the public, and we have lost sight of the ideal which has been referred to in this discussion. What we want is to devise some scheme by which our students as they graduate from us will go out with the idea that they are going to give service and that they are going to give honest service and that

they are going to be honest citizens. It does not make much difference what kind of a curriculum you formulate here, unless you can give them the idea that they are going out with those ideals. We must take into consideration the human element always. Men come to us with the idea that they are going out to make a living exactly as a man goes into plumbing or groceries or dry-goods or anything else, and the public realizes that many of the dentists who graduate from all our schools are trafficing in their knowledge—I mean in the knowledge of the dentist—and in the ignorance of the public they serve. We should do something that will tend to send our men out better than they come in and with higher ideals. There are many men here that we look up to; the curriculum of the colleges they attended was not very much, but they have come out and have made a place for themselves in the profession of dentistry. And if we can just do something that will give our men the idea that it is not necessary to go out and prostitute their life's calling —that there is even more money to go out and be honest, not to prostitute their profession and not to maltreat the people with whom they come in contact,—our colleges will be more successful than they have been, whether you give one or ten hours to any particular subject.

Dr. J. E. Nyce, New York

Just a few words. As Dr. Thornton has so ably said, it is in the man himself. No matter what school he graduates from, he must develop the latent power to become a proper man to enter a profession. That should be our ideal in trying to teach our students what their calling means to them.

In regard to prosthetic dentistry, and, as Dr. Roach has put it, the lack of interest in this important branch. In the first place we are trying to overcome that tendency in New York by section work, or taking the class in sections, and bringing before them patients for the purpose of illustrating the conditions we may find in the mouth, in other words we are teaching them to distinguish what is the best appliance to place in the mouth. We are teaching them to note the condition of the mucous membrane, teaching them the anatomy of the mouth in general; to note where faulty extraction has been made, and then to decide whether correction should be made by means of bridge work, plate work, inlays, or whatever it is to be. A great many teachers do not lay stress upon the fact of the force of mastication, the force to overcome or to oppose. From the very beginning we are endeavoring to instruct our students in prosthetic dentistry in that way. We believe that prosthetic den-

tistry should be taught every year of the four years. To be successful, the prosthetic dentist should be an artist as well. He should be able to develop that finger craft which is required of the very finest mechanic, I might say. Therefore our first-year students are given enough prosthetic technic to develop that finger craft. It is all very well to let them read text-books and to talk to them from the rostrum, giving them all the lectures you please; but if they are not able to transfer from the brain to the finger ends, they fail of their purpose.

When the four-year course goes into effect in New York State, we want to eliminate from the last two years the general subjects, as was said this morning, giving during those years solid dentistry and the subjects allied thereto. Of course, it may be in the teacher, it may be in the methods employed, but he should be so enthusiastic that he will be able to sufficiently enthuse the students under him to take the required interest in the work. We know of a number of schools that are simply turning out mechanical men. As far as I am able to learn, and I feel quite certain of my ground in making this statement, there are not any graduate or licensed dentists at the head of these schools. They are simply turning out mechanics with no idea of dental anatomy or anatomy at all, and with no idea as to why they construct a denture this way or that, why bridge work should be constructed one way or the other; they do not see the patient, they do not know anything about the particular case.

We should develop a student so that he will be able to judge for himself and give of himself the best possible service to the public. We should not forget the public in dealing with our students. Frequently appliances are put in the mouth that do not belong there, they are unsanitary. In our infirmary I have opportunity to observe many cases of that kind that come to us for correction. And we take such cases before the students and give them thorough instruction as to the conditions that we find, showing them and telling them the whys and the wherefores, why they should not do this and why they should not do that. And if we always keep that in mind and remember the service which they are to give to the public, I believe we will serve not only the profession, but the public in a better manner.

Dr. T. W. Brophy, Chicago

I did not expect to say anything on this subject, but the different attitudes apparently taken by the speakers has prompted me to make two or three statements.

In the first place it seems to me that Dr. Owre has a misconcep-

tion of the functions of a literary institution. What is the college or the university for? Are we going to take the place of the university in teaching, or teach what students should learn in the university, and give them credit for a year on that? No.

Now, if we really mean to advance the standard of dental education in this country, this body could not do better than to formulate a course for the student to take in the university or in the high school which shall meet all the requirements that Dr. Owre has proposed in his suggestion, so that he may come to the dental school well educated with the expectation then of taking a four-year course in dentistry, and not come to finish up what he should have learned while he was in the preparatory school. We do not propose to be school-masters and teach those branches which the student should learn before he enters the professional school. If we do, then we are not acting in good faith, we are not having a four-year course in dentistry.

One gentleman stated that the students of the school which he represented were going to pursue in the university a course in biology, chemistry, and so on, and then when they came to the dental school get credit for a year. If that should be done then we haven't a four-year course—we are going to practically continue in the old way of a three-year course in dentistry. If one institution sees fit to give the student credit for a year because he has taken English, biology, chemistry and physics in the university, then all the schools will feel that they have a right to do so, and will do so.

So I am serving notice on this body right now that if that policy is pursued in any considerable number of university schools, then the four-year course will be a thing of the past and we will have only a three-year course in our dental schools.

Regarding the proposed schedule, I find in it 16 hours given in orthodontia in the senior year. I was pleased with the remarks made by the young man who spoke a few moments ago. It takes a man three years to learn to be a plumber, and it takes a man three years to learn to make boots. It strikes me that it would take a dental student, if he learns all about retrusions, protrusions, prognathism and irregularities of the teeth that are so common, if he learns how to use all the appliances that are utilized in the correction of deformities of the face in orthodontia, at least as long as it would take to teach a man to make a pair of boots.

Dr. Owre: The course which we have adopted calls for 32 hours.

Dr. Brophy: Four eights are thirty-two. The course then includes four days' work. Does any one believe four days is long enough to learn orthodontia? The student is *supposed to learn* orthodontia. In the earlier years he gets more in his technical work. But I do not believe we realize the changes that have come in the manipulative part of the work of our profession. I do not believe that this subject can be learned in four years. If a young man goes to the university a year for biology and the associated studies and gets credit for one year in dentistry which he does not take, then we ought to have a five-year course because we need four years in which to teach dentistry. We must have a bona fide four-year course if we are true to our pledge. It seems inconceivable that any dental school should contemplate matriculating a student, then send him away to school a year and give him credit for a year's course in dentistry which he does not take. What has occurred here this afternoon is a step backward. We pledged ourselves in the Faculties' Association that we would have a four-year course, and here we have men advocating a three-year course in dentistry. That is what they propose to do. It is a fact, and I am surprised beyond measure that in this body now, just before the work is to begin, a three-year course is advocated. If a man would devote all his time—and any man here thoroughly acquainted with orthodontia will endorse everything I say,—if a man were to devote all his time to orthodontia, to say nothing of operative dentistry, prosthetic dentistry, crown and bridge work, etc., he could not learn how to be a good orthodontist in three years; he would know very little about it in three years. And yet you are proposing here to cut off a year's work in dentistry in order to give a student preliminary or pre-dental training which he ought to acquire before he is matriculated in the professional school. It is perfectly absurd.

Dr. F. B. Noyes, Chicago

In the work of special committees such as this, the grouping of subjects is, as Dr. Thornton said, more or less arbitrary, and therefore the appearance of orthodontia coupled with prosthetic dentistry had no significance as far as this body was concerned. And still it seems to me that the position of orthodontia in the dental curriculum at the present time is one of the most important pointers as to what is necessary in the organization of dental curricula. For if you will examine the catalogues of the dental institutions of the country, you will find that in a very large proportion of them orthodontia is taught as a subordinate

branch of prosthetic dentistry, that is so arranged and organized in the curriculum and in the organization of the institution.

Now, the reason that we are here, as I see it, is that dentistry has grown very, very rapidly in the last ten or fifteen years; grown in output and grown in detail, and our dental curriculum has become more and more crowded by details. The problem that confronts the dental institutions as well as this Institute, is the organization of a new curriculum which shall embody the essentials for elementary training, and eliminate the details. I mean by that, referring to what Dr. Brophy has said, it is perfectly obvious and is universally recognized that it would be impossible for any dental school to adequately train a man in orthodontia in three years or in four years, and still we all recognize that orthodontia has a place in the dental curriculum. Now, what is that place? I might take any other one of the topics in prosthetics: any one will admit that it is impossible in four years to give a man detailed instruction in every kind of prosthetic appliance that has been described in dental literature in the last year alone, to say nothing of the last ten years, and yet I believe no one here will deny that it is perfectly possible to give a man sufficient instruction in prosthetic dentistry to enable him, with the knowledge given him, to acquire the ability to construct any of the appliances described in the literature.

Is it not, then, necessary for us to remember that commencement day in the dental school means what it says? The graduate *commences* to be a dentist, he has been given by the school sufficient fundamental training to *begin* to learn to practice in dentistry's essential departments; not that he knows it all, not that he is competent to be considered an expert in any one of its departments, but that he has been sufficiently grounded in the fundamental principles of those departments to proceed as an intelligent being and as a servant to the community.

In studying the organization, then, of a curriculum, it becomes necessary for us to distinguish between the essential and the non-essential; between that which gives a man training to acquire any details, and that which scatters him into so many details that he fails to acquire the ability to acquire any.

Dr. Owre: I am very glad to be reminded of my deficiency in academicals, and I will, therefore, appeal to those who wear the academic mantle in any future discussion. The speaker remarks that English and biology, for instance, are not dentistry. Is, for that matter, chemistry? Yet we all teach chemistry. Is bacteri-

ology dentistry? Yet we all teach that. Why should not we be honest with ourselves and put these subjects where they properly belong, call them by their true names, and charge the fee according to academic scale? These are merely thoughts and questions we ought to have before us.

Dr. Roach,
(Closing the discussion)

Just a word first about what I said in regard to dentists not being interested in prosthetic work. I did not refer in the report to the importance of this subject, which is greater at this time than for a few years past. You know as well as I do that today, as Dr. Noyes has said, the practice of dentistry and especially the practice of prosthetic dentistry is a condition and not a theory. And in view of the fact that today we are being forced to extract more teeth than for twenty-five years past, or that we are losing more natural teeth than at any time during the past twenty-five years, shows that there is a greater need for better dentistry, for better prosthetic dentistry. And due to this very fact, too, not only do we recognize the importance of better prosthetic dentistry, but the medical profession and the public recognize the importance of better prosthetic dentistry. For that reason, as intimated in my report, it is up to the men that are teaching this subject to create in the student an interest in this work and to teach him how to meet this demand.

As stated, our boys are not sufficiently interested in this purely mechanical side of dentistry, and I attribute that condition to the presence of the strictly mechanical laboratory man. It is a condition there and not a theory. These things exist. What are we as teachers going to do to meet this condition? In investigation of these conditions I have been appalled to find that students right from the very beginning of their student life are leaning upon the mechanical dentist, the dental laboratory; he feels that he can go to the dental laboratory and for a consideration secure that service which he traffics in, if you please, at the expense of the public, which is not right. It is up to the teachers of this department to see that students are sufficiently interested in this subject and are so adequately taught that they can go out and intelligently deliver this class of service to the public. For a dentist who has received his training in any one of the institutions represented by the men present here, to go to the mechanical man who has never seen the inside of a dental institution, who has never had any education whatever other than that which he has obtained through his mechanical training

in the mechanical laboratory, and allow this man to dictate to him what he shall put into the mouths of his patients, to my mind is preposterous. And yet if you will investigate the matter you will find that a vast number of men in this country are doing this thing without any knowledge of the requirements, they are suggesting, and not only suggesting but dictating to dentists what they shall put in the mouths of their patients. And this is to us a very important phase of the subject, and to me it is one of the conditions that we have to contend with and give serious consideration to.

Just a word about the technic course in the freshman year. I am sorry that this discussion has been so rambling. I think I would have called Dr. Brophy, and first of all Dr. Owre, to order for introducing the four-year course in the discussion of report of this committee. They probably would have made better headway if they had stuck to the report instead of discussing the subject promiscously as they have done.

I feel as Dr. Dewey does about orthodontia. Orthodontia is a specialty, and when we consider there are so many specialties to dentistry it is very hard for us to teach men to become thoroughly proficient in any one of these specialties, we can only give them the foundation. We do not expect, Dr. Dewey, we do not expect, Dr. Noyes, that we can send out men that are thoroughly familiar with these subjects. But, as Dr. Noyes has said, we can give them the foundation whereby, if students at all, they can go out and master these subjects after they leave us.

So I feel that in the technic we give the student in his first year of prosthetic work, that is, the work of the larger type, he can handle this in his freshman year better than work which has more minutia, and for that reason we are, from the prosthetic viewpoint, gaining a little more time to devote to this technical training rather than gaining very much more time in any other respect as a technical subject for the teaching of dentistry in general. That is all I have to say with reference to the four-year course.

Dr. Dewey spoke of the very limited amount of time I referred to in my report. I find that in the report I gave to orthodontia 224 hours. I grant that this is not enough, and yet upon consultation with orthodontists whom I knew I found that they thought this would probably be criticized as too much time to be given to the subject of orthodontia in view of the fact that very few men who go out really expect to make a very extensive practice of orthodontia. It is not so important that an extensive amount of

time be given to orthodontia as to prosthetic or operative dentistry, for the reason that dentists as they go out will be required to do in their practice more prosthetic and operative work than they will orthodontic work.

Then, too, the criticism has been made that I have allotted too much time to prosthetic dentistry, 1300 hours, and that it is an unbalanced division of the time. In summing up the curriculum of the College of Dentistry of the University of Minnesota, I notice that Dr. Owre has about 1100 hours devoted to this branch, while the committee's report has about 900 hours. In my report a great many of the total number of hours designated for this subject may be quiz hours. And in view of the fact that prosthetic dentistry is of a practical nature, and if you will take into consideration that so many of those hours are laboratory hours and hours spent in the technic work, you will realize that they constitute hours of actual rest, if I may so express it; those hours afford a mental rest, they give recreation. As the largest part of the hours spent in prosthetic dentistry is made up of laboratory technic and clinical work, it is recreation, enabling the student by reason of this recreation to spend more time with this theory or his other subjects which are so necessary in broadening his education in dentistry generally.

REPORT OF COMMISSION ON PROSTHETIC TECHNIC.

Two years ago the report of this Commission endeavored to show what the schools were requiring of their students in Prosthetic Technic.

Last year a list of principles which were considered essential was presented and thought by several to be rather extensive.

This year your Commission desires to slightly modify the list of principles and suggest a minimum number of cases which will exemplify these.

Principles which should be applied in technic requirements:

1. Impressions in compound (full and partial).
2. Impressions in plaster (full and partial).
3. Impressions in compound and plaster.
4. Pouring and separating impressions.

5. Adapting trial plates to full and partial cases.
6. Waxing.
7. Flasking and packing full and partial cases.
8. Vulcanizing and finishing.
9. Repairing vulcanite:
   (a) Cold packed.
   (b) Waxed and flasked.
   (c) Replace gum section.
   (d) Grind tooth to fit pink gum.
   (e) Fusible metal repair.
10. Partial upper vulcanite:
   (a) Clasps and supports.
   (b) Gum block.
   (c) Tooth ground to replace recent extraction.
   (d) Tooth ground to replace remote extraction.
   (e) Restoration of lost alveolar tissue.
   (f) Palatal bar.
11. Lower bar cases.
12. Full case after recent extraction.
13. Clasps:
   (a) Attached to vulcanite base.
   (b) Attached to metal base.
   (c) Attached to bar in lowers.
14. Tin foil matrix.
15. Casting.
16. Moulding for zinc and lead.
17. Casts and dies:
   (a) Full.
   (b) Partial.
18. Swaged:
   (a) Full.
   (b) Partial.
   (c) Attachments for vulcanite.
19. Compensating exercise for hard area.
20. The facebow and other measurements.

21. Full case articulated to natural in opposing jaw.

22. Upper and lower anatomically arranged—varying condyle path.

23. Gum sections.
    (a) Full.
    (b) Single block.

24. Occlusion and contour models for full and partial cases.

25. Special attachments.

26. Splints.

27. Obturators.

28. Facings and crowns on:
    (a) Metal base.
    (b) Vulcanite base.

Your Commission has given this matter serious consideration and suggests the following as a minimum course embodying the above principles:

1. Impressions in compound.
   Casts trimmed for investing for vulcanizing.

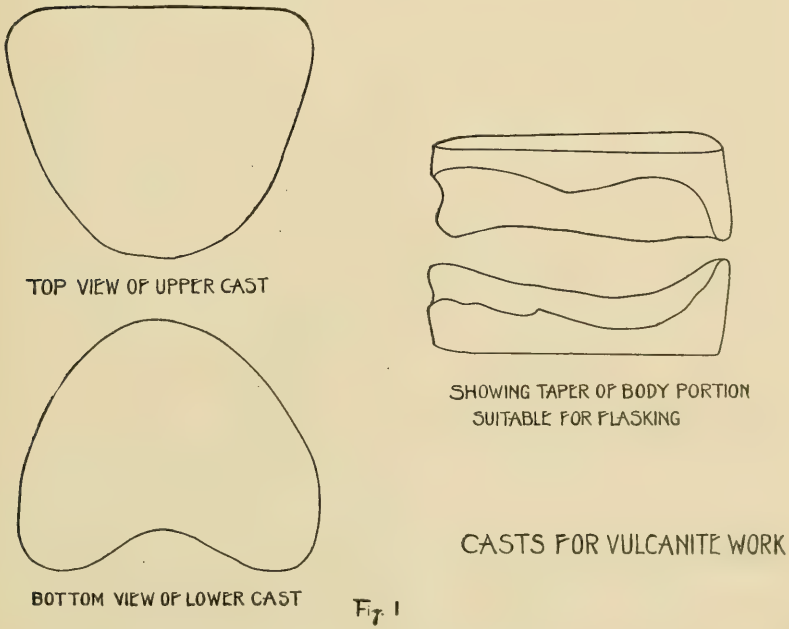
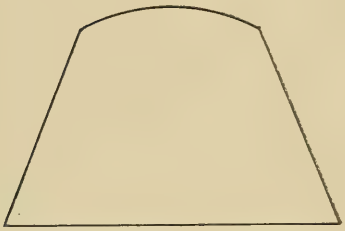

TOP VIEW OF UPPER CAST
BOTTOM VIEW OF LOWER CAST
SHOWING TAPER OF BODY PORTION
SUITABLE FOR FLASKING
CASTS FOR VULCANITE WORK

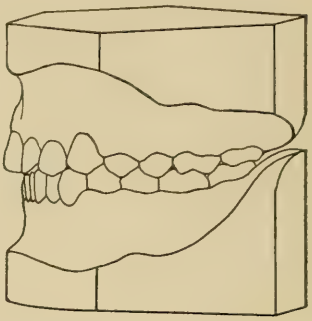
Fig. 1

2. Impressions in plaster.
   Casts trimmed for Orthodontia Department.

TOP VIEW OF UPPER CAST



BOTTOM VIEW OF LOWER CAST

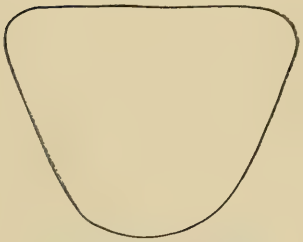


SHOWING FORMATION OF BODY PORTION

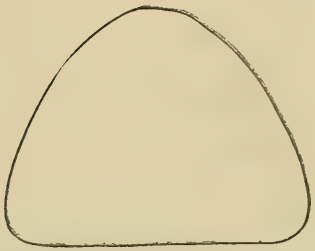
ORTHODONTIA CASTS

Fig 2

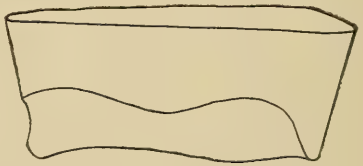
3. Impressions in compound and plaster.
   Models trimmed for moulding in sand.

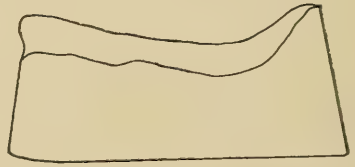


TOP VIEW OF UPPER MODEL



BOTTOM VIEW OF LOWER MODEL





SHOWING SHAPE OF BODY PORTION
SO THAT IT WILL DRAW FROM MOULD

MODELS FOR DIE MAKING

Fig 3

Principles embraced in these three: 1, 2, 3, 4.
Models may be used at chair for No. 19.

4. Vulcanite base—no teeth—may be used later in No. 8.
Principles: 5, 6, 7, 8, 14.

5. Temporary upper denture—plain teeth.
Principles: 5, 6, 7, 8, 10 (c), 12, 14.

6. Partial upper:

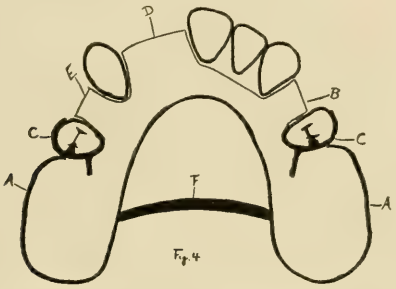


Fig 4

(a) Replacement for lost alveolar tissue.
(b) Replacement for tooth recently extracted.
(c) Clasp and support.
(d) Gum block.
(e) Replacement of one tooth remotely extracted.
(f) Palatal bar.

Principles: 5, 6, 7, 8, 10 (a) (b) (c) (d) (e) (f), 13 (a), 23 (b), 24.

7. Partial lower—bar and clasps.

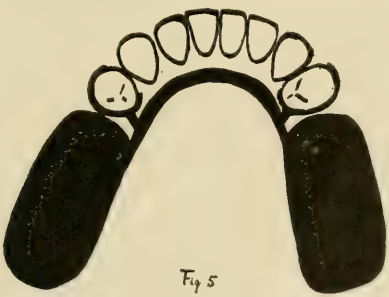


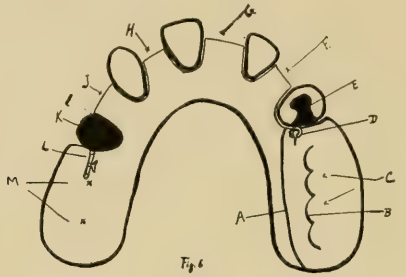
Fig 5

Principles: 5, 6, 7, 8, 11, 13 (c), 24.

8. Full upper to natural lowers (gum teeth).
Principles: 5, 6, 7, 8, 14, 20, 23 (a), 24.

9. Upper and lower—upper swaged—lower cast.
Vulcanite attachment—plain teeth.
Anatomically arranged—15%.
Principles: 5, 6, 7, 15, 16, 17 (a), 18 (a) (c), 20, 22, 24.

10. Partial upper metal:



(a) Triangular wire to finish vulcanite to.
(b) Loops soldered.
(c) Vulcanite attachment for crowns or teeth.
(d) Roach attachment.
(e) Gold inlay.
(f) Goslee cuspid.
(g) Steele facing.
(h) Lateral facing.
(i) Clasps.
(j) Davis biscuspid.
(k) Gold crown.
(l) Gilmore attachment.
(m) Tube crowns soldered.
Principles: 13 (b), 16, 17 (b), 18 (b) (c), 24, 25, 28.

11. Repair:
No. 5 may be broken for ordinary repair also for 9 (a) (b) (c).
No. 9 for 9 (a) (b) (d) (e).
No. 8 for 9 (c).

12. Splints and obturators as each instructor deems advisable.

No. 10 might be divided into two or more cases, but much of the drudgery (impressions, casts and dies, etc.) may be overcome and time saved by including it all in one.

W. E. WILLMOTT, Chairman.
A. HOFFMAN,
G. S. CAMERON.

REPORT OF THE COMMITTEE ON ORAL SURGERY, ANESTHESIA, RADIOGRAPHY AND PHYSICAL DIAGNOSIS.

ORAL SURGERY.

Surgery per se whether general or special cannot be taught. It is a composite subject made up of Anatomy (gross and microscopic), Physiology and Pathology, including Bacteriology, plus technique.

Physiology requires as an antecedent general chemistry, organic chemistry and biochemistry. Pathology and Bacteriology, both require Histology and Chemistry. It is obvious, therefore, that the curriculum must be arranged in orderly sequence if the general subject of surgery is to be presented satisfactorily; in fact, unless the student has received adequate preparation the subject is not only unsatisfactory, but impossible to both the student and teacher.

In the four-year curriculum it will be possible to present the necessary prerequisites before any clinical instruction in surgery is given.

Your Committee would recommend that emphasis be placed upon principles rather than upon special technique.

The course should not be designed to prepare the student to practice Oral Surgery, for this is impossible, but to fit him to recognize surgical lesions, and in collaboration with those properly qualified, to render expert service. No one may practice any surgical specialty who has not received adequate training in general surgery. A perspective is paramount. To fit a dental student, therefore, to be intelligent in the matter of surgical diseases of the mouth and their relationship, is to render a necessary service to the public. With this premise in mind, we suggest the following curriculum:

JUNIOR YEAR.

A course in the principles of surgery by lecture and recitation, covering at least one hour a week through the year. This may be concurrent with courses in Physiology and Pathology. For the course a good text book should be used, such as Adami & Mc Rae, Senn, Lexer-Bevan, Nancrede, etc.

SENIOR YEAR.

A lecture and recitation course, one hour a week throughout the year. The aim of this course should be to present the subject

of surgery in outline, requiring the reading of assigned subjects in selected text books.

A clinical course of three hours a week throughout the year. This is the one opportunity of the entire dental course to demonstrate the interdependencies in disease processes. To properly teach surgery is to teach medicine. Students in groups of two to four should be assigned cases for examination, diagnosis and outline of treatment. The reviewing of this examination and report by the principal furnishes the best possible opportunity to teach and to learn. The clinic should be largely diagnostic in character. Only the minor operation should be emphasized.

An operative clinic dealing largely with major oral surgery is not a good means of preparing a student for the practice of general dentistry. Case histories should include the examination of tissues removed in operative cases with general and special observations until the case is dismissed.

The subject of extraction of teeth calls for special emphasis and instruction. A well organized extracting clinic requiring the attendance of Senior students is a necessary and important function of the department. The attendance requirement should not be less than ten hours.

ANESTHETICS.

Anesthetics is essentially a practical subject and cannot be taught in abstract. The theoretical study of the various anesthetic agents properly belongs to the department of Materia Medica and Therapeutics. Practical instruction in the subject should be a necessary routine in the surgical clinic. We do not appreciate the need or function of a special chair for instruction in anesthetics.

RADIOGRAPHY.

Radiography has made diagnosis in dentistry more definite and satisfactory. The Senior student in infirmary practice should be taught the use of the rontgenogram in every case where its use is indicated. The X-Ray laboratory should be available at all hours for practical purposes. At least one member of the resident infirmary staff should be competent to operate the apparatus. The requirements should include a course of lectures dealing with the science of rontgenology apparatus, and technique. Each student should be required to follow at least six practical cases, assisting the instructor both in the exposure and development of films and plates.

PHYSICAL DIAGNOSIS.

A definitive program of physical diagnosis in a dental course cannot be found in any large group of colleges represented in this organization. In many colleges the course is traditional, and, like many educational traditionals, owes its life to sentiment.

Physical diagnosis is an interpretation of the phenomena observed on inspection, palpation, percussion, auscultation, mensuration, etc. Physical diagnosis has its major emphasis, in the medical curriculum, in the analysis and interpretation of heart and lung conditions. The crux of this whole question is found in the obvious fact that no lung or heart examination can be accepted unless it is thoroughgoing and accurate, and no dentist can make such an examination. "A little learning is a dangerous thing," and while this subject may be added to the dental course as a cultural factor, one might easily select more useful and important medical subjects for this purpose.

However, a course on the use of the stethoscope; the art of percussion and palpation with demonstrations will add to the dental students general intelligence and appreciation of internal medicine. Dental bigotry decreases with an increased ratio of medical knowledge. Such doctrine as this may be called iconoclastic but we believe a dispassionate analysis of the facts will acquit your committee of iconoclasm.

If physical diagnosis is to be placed in the curriculum it should be presented by a skilled internist in the second semester Junior year, or in the Senior year. Eight or ten hours will probably be ample time.

ORAL SURGERY.

Junior year—34 hours. One hour a week throughout the year.

Senior year—136 hours. Four hours a week throughout the year.

34 hours didactic and 102 hours clinical instruction.

ANESTHESIA.

Theoretical instruction assigned to department of Materia Medica and Therapeutics Practical instruction a necessary part of the course in Oral Surgery.

RADIOGRAPHY.

Radiography 6 to 10 hours lecture course given in second semester Junior year or first semester Senior year. Practical instruction in infirmary practice. Special assignment of at least six cases to Senior students.

PHYSICAL DIAGNOSIS.

6 to 10 hours didactic instruction with demonstrations. Second semester Junior year or Senior year.

Respectfully submitted,

Committee:

CHALMER J. LYONS,
VILRAY P. BLAIR,
FREDERICK B. MOOREHEAD, Chairman.

DISCUSSION.

Dr. T. W. Brophy, Chicago

Surgery is defined as that branch of medicine which treats diseases wholly or in part by manual and operative procedures.

Now, I think that the essayist might have made himself a little clearer in the first paragraph of his report. I understand exactly what he means, but I do not think his meaning would be clearly understood by one who has not studied the paragraph carefully. He states that surgery *per se*, or in itself, whether general or special, cannot be taught—that is the first proposition; then he says, "It is a composite subject made up of anatomy, (gross and microscopic), physiology and pathology, including bacteriology, plus technic." Well, I agree with him that these are part of surgery. But they do not make up oral surgery or surgery. In that particular I would have to take issue with him. They are an important part of surgery, but surgical manipulations, not mentioned here, are an indispensable part of surgery. And what applies to surgery generally applies to oral surgery. In all that has been said by the essayist regarding the importance of physiology, anatomy, pathology, bacteriology, etc., I agree with him. I agree with him in regard to the time that he suggested as important to bestow upon this subject.

Before the meeting opened, in a conversation with Dr. Owre I wished information regarding his schedule that has been prepared,

and I found, as I understood, that it included 32 hours work in oral surgery or four days work. He explains that that department which he calls practice, is in part oral surgery. I was very glad to learn that he included a greater amount of time in the work of oral surgery than 32 hours, because 32 hours of the entire curriculum would certainly not be enough.

In Dr. Moorehead's classification he gives us altogether 204 hours for the entire course of instruction.

The teaching of oral surgery does not differ any from teaching surgery in any other department. In the first place the surgeon must decide on his course of instruction. In his first appearance before the students he should announce that the course will consist of this work. He should explain to them that it will include certain subjects in the course, and then a student who is fully awake to the importance of learning all that he can of the subject will begin to read and study so that he may be prepared to answer questions, so that he may acquire information upon it. And then when the principles have been well laid, and I agree with the essayist exactly that the teaching of principles is a matter of the greatest importance, and when it comes to the question of showing him the technic of the work to be done, he will have an opportunity to make observations.

I would hardly be willing to accept the statement made that the dentist shall not do these operations, though legally perhaps in some states he would not be qualified except with the degree of M. D. But we know from what we have learned of the work that is going on abroad that the dentists are doing herculean work in surgery of the face on the field of battle and in the hospitals of the countries engaged in warfare. We know that the dentist who has been well trained in oral surgery is the only one who is capable of constructing applicances for the correction of fractures and injuries of the jaws and the face, as an example of which I would say that patients who come from the hospitals generally, and we have a great many of them with fractures of the mandible, as a rule come into the clinic with their heads tied up with bandages fixed so tightly that the fragments are driven further out of place than they would have been if left without bandages. So the bandaging that has been employed has been a positive detriment to the healing of the fractures. We know that it is not within the province of the surgeon and it is not possible for him to construct such appliances as we call for in the correction of

fractures of the mandible. It is outside of his domain. And so the dentist must prepare himself to perform these important duties. How many patients have I seen with fractures of the mandible distorted, under the care of doctors of great repute, with an elevation on one side and depressed a quarter to three-quarters of an inch on the other side, due to the fact that the surgeon failed to approximate the ends of the bone and hold them in quiet contact until they were united.

This is an important part of oral surgery, and the man who engages in it must understand principles. He must understand sepsis and asepsis, he must understand how to make use of all the appliances that have been devised, select from them one suitable to the case in hand and apply it. Unless incidents on the other side of the water might possibly change this statement, I am quite satisfied that Dr. Dunning of New York has treated more cases of fracture in this line of work than any other man living or dead. Dr. Dunning has employed all the means known for the treatment of fractures and has treated all the various diseases and conditions about the mouth. But I agree with Dr. Moorehead when he says that every man who undertakes this work must thoroughly understand the principles underlying the practice of surgery, and aside from that he must know how to use his fingers, must be trained digitally. I believe with him in bringing the students down out of the benches, putting them before the patient, and leaving the case for the students to make diagnosis. It is my habit to bring down students in this way and to enjoin each one to be silent until after he has made a careful examination of the patient, no matter what the condition may be, a tumor or fracture or someting else. He must make his diagnosis and withhold his opinion until it is called for. And it is one of the most delightful experiences in my life to ask the opinion of young men regarding the condition. Sometimes they widely differ, so much so that it is more interesting; then I ask them why they believe as they do, they state their reasons and so on all the way around and finally some one may be right, and sometimes all are wrong. In this way we incite an interest in the subject so that our students are more deeply impressed by what they see and they are more eager to learn.

One of the greatest difficulties I have had to contend with has been in getting the students in the infirmary to leave the practical dental work and go into the clinics, and I have found that it was necessary to make these courses obligatory. Therefore

a certain number of students, perhaps 60 or 80, attend the clinic, the roll is called, and the absentees, if absent a certain number of times, are questioned as to why they are absent, and any one absent all the time will never graduate because I cannot vote for a man to graduate who has either carelessly or due to some other cause omitted to take the most important instruction of my course. I believe that with knowledge of the principles and with the technic of the surgical procedures which they must learn, with an understanding of the pathology and how to make a diagnosis, and then knowing how to administer anesthetics (and they do learn how to give anesthetics), the student is prepared to undertake operations of a minor kind. I would hardly expect him to do major operations. In this the essayist is correct. Take the simple operation of removal of the apex of a root of a tooth in a diseased cavity where left by an alveolar abscess; they have been taught to do that and do it well, but certainly the general surgeon does not know how to do it. Ordinarily he would take out the whole side of the jaw if an infection like that existed.

So it is the dentist who must do this work and must know the pathology of the parts. And in this connection let me say that unfortunately the schools of medicine do not give their students an opportunity, with some rare exceptions, to learn the pathology of the teeth and how to make a diagnosis of some conditions that exist in parts quite remote from the teeth and from the oral cavity, but dependent upon the teeth for their origin. These things are outside the domain of medical education. There will have to be some great changes made in the curriculum of the medical schools if it comes up to the standard fixed by the definition of medicine. Medicine is said to be the "Healing art in all its branches," but we know it is not, and the standard must be changed.

It would not perhaps be digressing from the subject to say that unfortunately for the human family the medical man has learned a good deal about oral sepsis, how it is the cause of arthritis deformans and many other abnormal conditions. And so he says to his patient, "Have your teeth out." What does he know about teeth? Why should he send a patient to an eminent member of the dental profession with the message, "Extract his teeth?" It is incompetent for him to pass upon the subject because he has never studied in a dental school, or elsewhere, and since graduation from the medical school he has not learned all these things. If he happens to find a little cavity at the tooth root which long ago may

have had an abscess and which even now is firm and free from irritation and disease, he says, "Have your teeth out," and directs some dentist to take them out as though he was to be ordered by the court. Here is where one of the greatest evils arises in professional education today. I admit that the dental student has not in the past (but he is getting it now) learned enough about general pathology, and I also know that the physician has not learned dental pathology with all its intricacies.

As an illustration of what I say, just a few days ago a young man associated with me in my office was called by a patient to have all the teeth out, for an eminent physician had said, "These must be taken out because you have rheumatism." Skiagraphs had previously been made, but new ones were made, and it was found that a bicuspid tooth had a little cavity in the bone at the end of the root. There were other teeth which had been well filled by some dentist. After consultation my associate said to the patient, "I think we had better take this root out, but the other teeth are healthy." The incisors were absolutely healthy, not decayed, and finally he decided to take out the root merely as a matter of satisfying the patient because she thought that might be the cause of her trouble. These parts were thoroughly washed with alcohol, sterile instruments were used, and when the root was taken out no fluid was found around the end. But to satisfy himself he placed what he found in the sinus in the hands of two noted pathologists and the result was negative, there were no pathogenic micro-organisms present.

That is what we are up against all the time—men who declare the teeth should be extracted when they are not diseased, and on the principle that many years ago men advised extraction of the teeth when they could not make out what else to do. It is based on the same principle which actuated the old doctor when he emptied the contents of all his bottles into a certain receptacle so that he could use his bottles for something else, and when a case came along that he did not know what to do with he gave the patient some of that. Shall we do the same thing,—"Have the teeth out," because the patient is in misery? No. And while in this subject of oral surgery we have deplored the fact that enough attention has not been given to it, we must also deplore the fact that medical men have not had an opportunity to learn the intricacies of dental pathology. Consequently they are groping in the dark and doing irreparable harm to those who apply to them as

patients, by advising them about a subject of which they possess but very little or no knowledge. I say this without the slightest desire to reflect upon the intelligence of the medical profession; how can a boy help it if he goes through college and never had an opportunity to learn a subject that he has occasion to act upon? It is not his fault, the fault lies with the teachers of the institution. And when the time arrives that the teachers of medicine will sit at the feet of a man who is competent to teach them these general principles that have been suggested by the essayist and to lay down the rules that govern the treatment of disease of these parts, and the dentist has reached up to a place where he understands general pathology and general surgery, the dental profession and the medical profession will have made a great advance and will have attained a higher and a better place among the people of the world, and they will have accomplished a higher and better end for the care of those who come under their treatment.

Dr. E. H. Long, Buffalo, N. Y.

The subject of this report is quite a large one, too inclusive for my treatment, and so I shall not presume to discuss at all the oral surgery part of it. This has been covered ably by Dr. Brophy, and I assume, at any rate, that I am expected to pay more attention to anesthesia and physical diagnosis.

The report is to be commended. Its conclusions are, in my opinion, correct and well founded.

In regard to the subject of anesthesia, I believe that the ground is well taken that anesthesia is better taught objectively than by theory; therefore it is properly a part of the subject of surgery. Nevertheless, there is abundant opportunity in every dental infirmary to teach the students practical anesthesia in connection with the usual operations of extraction.

The question of anesthesia relates to the old problem that we meet with every year as asked by students: Shall a dentist give, or be responsible for giving, a general anesthetic? You have all thought of that question; it always is a live one.

For one, I do not see why a dentist should not give a general anesthetic, provided he has had the training essential to giving the anesthetic and to meeting the possible dangers that may arise. It is generally assumed, I believe, that it is perfectly safe for a dentist to give nitrous oxid, because of the very slight danger connected with that agent. However, in the rare cases where danger

symptoms do occur, the dentist ought to have the necessary knowledge to meet the danger, and I doubt not that the time is coming when it will not be considered proper to give even nitrous oxid without an examination of the heart, because it is not always possible by the appearance of a patient or even by the statements which he makes, to determine whether heart disease exists or not; and valvular heart disease might be a source of danger in nitrous oxid anesthesia. It may be remarked also that general surgeons are coming to rely more and more upon expert anesthetists in their work, not only because it means greater safety, but it assures better results in the giving of the anesthetic.

In my own course, I am aiming to give five hours of instruction in the theory of anesthesia in the junior year and fifteen hours in the senior year, besides practical demonstrations in the extracting-room. When we have the four-year course I believe that this time should be extended somewhat in order to give students a greater amount of practical instruction.

I find that one very important part of the teaching of anesthesia is to warn the students against such proprietary mixtures as Somnoform. Some certainly will be deceived by the claims and assurances as to safety of such a mixture and will use it indiscriminately and possibly with danger and fatalities.

I feel that it is impossible to separate the subject of anesthesia from that of physical diagnosis. And while I appreciate the statement made in the report concerning physical diagnosis as a conditional subject, if we are to make our men at all competent to co-operate with the physician in respect to the dangers of anesthesia, we must make him competent to recognize departures from the normal in the heart and lungs, and particularly in the heart. I aim to give at least ten hours in physical diagnosis, five hours in the second year and five hours in the third year, making the instruction as practical as possible, allowing the students to learn the normal sounds of the heart by examining each other, then taking them to the hospital to listen to the sounds of cardiac disease. But I try at the same time to impress upon them my belief that they cannot expect to become proficient in the diagnosis of diseases of the heart and lungs—that is too much to expect. Why? Because it takes the physician some years of experience and observation to really become proficient in making an accurate diagnosis of conditions of the heart and lungs. And again, some of the most serious conditions of the heart are those which are not shown by

auscultation, but refer to conditions of the heart muscle which may be only slightly evident upon any examination. However, just as Dr. Moorehead urges that the dental student should learn enough of oral surgery so to be able to diagnose diseased conditions of the oral cavity and to co-operate with the general surgeon, so also I believe that our students ought to learn enough about cardiac conditions to be able to detect abnormalities and to then throw the responsibility of anesthesia upon the patient's physician.

The recognition and the significance of cardiac murmurs should be thoroughly taught, the significance of irregularities and intermittance of the pulse likewise, in order that the dentist may be competent to co-operate with the physician.

Now, since there has been a little liberty allowed in discussion of the general topic of the four-year course, I hope I may be given a moment or two. With permission of the chair, I would like to propound a question here for the members to think about, in anticipation of the discussion of the general subject. With the situation as it is at the present time, why should not the dental student come to us with as good a preliminary preparation as that which the medical student must have upon entering the medical school? On an average, dentistry is more remunerative than is medicine. The dental student need not spend as much time in acquiring a knowledge of his profession as the medical student. He is better off by a couple of years. Now, inasmuch as the practice of dentistry is on the average more remunerative, and inasmuch as a practice is acquired more easily than is the case with the young physician, why should not we require the dental student to come to us with just as good preparation as does the medical school? That is a question which I think we might very well consider when we prepare to discuss how we shall use the fourth year and what we shall require of the student when he comes to us. If we should require a student to have his four-year high school course and one year of college in addition, he would then finish and take his professional degree one year sooner than the medical man would be ready for practice, because the latter would have to take one year in the hospital.

Dr. H. R. Raper, Indianapolis

I congratulate the essayist for two reasons: Because he sticks to his subject, and because he is not so overcome with the idea of teaching four years that he wants to give twice as much time to everything he talks about.

You are not particularly interested in what I think of this report, because it is never interesting when men agree, it becomes interesting only when they disagree. I can disagree with Dr. Moorehead only on more or less trivial points.

The report is in the main devoted to Oral Surgery. I have nothing to say about that part of the report except "Amen."

Considering anesthesia, Dr. Moorehead suggests that a special chair of anesthesia is quite unnecessary, that it should come under the subject of materia medica and therapeutics. That is all right if you give enough time to materia medica and therapeutics. But unless you extend your time for materia medica and therapeutics it is not all right. At the present time most dental students go out into the practice of dentistry without being able at all to make practical use of the system of prescription writing. Until they do go out able to make practical use of this, we do not want to add anything more to materia medica and therapeutics.

It has been my observation that while, of course, it is impossible to teach the details of administering anesthetics theoretically, it is a most excellent thing nevertheless to go over those details and come as near teaching the subject as possible in theory or in lecture work, and then give the practical or contact part of the work.

I am glad that Dr. Moorehead admitted he did not know much about the words, radiology or Roentgenology; if he did he would not use the word radiology. Radiology is the scientific study of rays, and it may be radium rays or it may be ultra-violet rays or it may be X-rays. What we teach in dental college is not even Roentgenology, which is the study of X-rays, for we do not attempt to teach the general science of the production and use of these rays for general work. What we do teach is dental radiography, which is the science and art of making radiographs of the teeth and interpreting them. Now, if we want a brand new word which really does express the dental use of the X-rays, what is the matter with the word RADIODONTIA?

Dr. Brophy spoke of a case in which diagnosis was made of a pus cavity at the apex of a bicuspid tooth. Careful technic was observed and the experimenters were unable to obtain a culture from the parts about the end of the tooth, which may mean that the radiograph was misinterpreted. What was thought to be the abscess cavity may have been either the mental foramen or the

antrum— one of the two—depending upon whether the bicuspid was a lower or an upper tooth.

Dr. Brophy: It was the lower, first bicuspid.

Dr. Raper: Mental foramen.

Dr. Brophy: The mental foramen is back of the second bicuspid.

Dr. Raper: Usually, perhaps, but it varies in different individuals and in different radiographs of the same individual, due to different position of the film or plate and the X-ray tube. (A good radiographer can move the mental foramen over a quarter of an inch.)

Dr. Brophy: In this case the mental foramen was just as distinctly outlined as your eye is now, and it was back the proper distance between the end of the root of the bicuspid tooth. The mental foramen was distinct.

Dr. Raper: Was this a radiograph or a plate or film?

Dr. Brophy: It was a film, and it was made with care. I know it is so, there is no question about it.

Dr. Raper: In such an event the way to determine whether a spot at the end of a tooth is the mental foramen or an abscess cavity is by making the radiograph extra-orally on a plate and see BOTH the foramen and the abscess cavity.

Dr. Brophy: There were seven different radiographs made of this case and they were on a plate before the patient came to us.

Dr. Raper: I grant you, Dr. Brophy, I might be wrong.

Dr. Brophy: Of course you are!

Dr. Raper: Dr. Moorehead suggests that ten hours is enough didactic work for teaching radiodontia. At a meeting of this body in 1913, at Pittsburgh, I advocated teaching radiodontia in seventeen hours. I still believe this much time is needed. However, I would be perfectly willing to make it fifteen instead of seventeen hours, because that does not make any particular difference, and I *could* get along in a way with ten hours, the time suggested by Dr. Moorehead. But I believe at least fifteen hours can be spent to advantage in the didactic work, using many lantern slides, because as you use lantern slides and teach the reading of radiographs,

incidentally you are giving one of the best courses possible in diagnosis.

And now, just to keep from talking about the four-year course ********** Thank you.

Dr. Arthur B. Crane, Washington

I am very glad that the essayist has brought out the fact that we need more time for instruction in this comparatively new branch of dentistry, oral surgery. I think perhaps of the major subjects in dentistry it is the newest. When I studied dentistry, which was not so very many years ago, the course consisted of possibly 20 one-hour lectures. Up to the year I entered no examination was required, then it was decided better to have an examination. However, at first the examination was oral, and the professor, dear old Professor Cryer, very kindly helped the students to answer the questions that they did not know and we all got through. But in a short time, fifteen to seventeen years, oral surgery has progressed until it has reached a stage where it might be well classed as one of the four major subjects in the dental curriculum. It has expanded so much in the field that it covers that we have found it necessary in our university to divide its teaching under two chairs. One chair takes up what might be called, with license, major oral surgery, the other chair takes up, what might also be called by the same license, minor oral surgery. The latter includes anesthesia the extraction of teeth, or exodontia, the amputation of roots, or apicoectomy, and such operations as have ordinarily been performed by the dentist at his chair under local anesthesia or possibly under gas anesthesia.

The main chair of oral surgery takes up the subject on the following basis: That the principle requirements for a surgeon are three;

First and most important, to make a correct diagnosis.

Second, an exact knowledge of the anatomy of the parts, and,

Third, a knowledge of surgical technic.

It seems strange that in teaching surgery we should place the knowledge of surgical technic last, but that is the last part of it that the average man studying under us will use. But are we to send students out into the world so poorly equipped in the knowledge of diagnosis as to allow malignant growths to develop under their very eyes because they have not the ability to make

diagnosis of the condition? Or, are we going to permit those men to go out into the world, and having made a diagnosis, produce more damage than good by operations because they have not a good knowledge of anatomy? The ability to make diagnosis cannot be gained by didactic teaching. We must take our students into the hospitals, we must establish clinics in the hospitals. Every hospital connected with a university that has a dental department, ought to have an oral surgery clinic, and it should be in charge of the professor of oral surgery; that is the place for students to learn diagnosis.

We have our students come in sections, and each student is required to write case histories, including diagnosis and prognosis, interpretation of radiographs, and everything else that goes along with the case.

The only place that the student can learn minute anatomy, such as he needs to know to perform operations in oral surgery, is on the cadaver. The great trouble with a large number of our so-called general surgeons is that they learn their anatomy on the living subject, and if their patients lived as the dentist's patients do there would be great condemnation of their methods, but when they die it is said, "The Lord took them." Every dental school should also supply to its students sufficient material in the dissecting room to allow opportunity for surgical dissection of the head, and require such further study in osteology and on manikins as will lead them to have the right knowledge of anatomy.

As I have stated, in our school the subject of anesthesia is connected with the teaching of extraction, and that is where it should be. In the extracting room the student learns to administer nitrous oxid and oxygen, and any man can successfully learn to administer these, for he has nothing to fear, as is the case with any other general anesthetic. He acquires the anesthetic sense and becomes capable of administering any anesthetic with little further training.

Ethyl chorid mixtures were mentioned. I have eliminated these entirely from our school because no student can learn the stages of anesthesia from any case in which anesthesia is complete in thirty seconds, quite aside from the dangers of the mixture.

Physical diagnosis should be taught at least to the extent that the student may know the normal heart and normal lung and normal kidney when he meets it. Attempt should not be made

to make of dentists internists nor diagnosticians of general conditions.

With reference to radiographs, from a good many cases sent to me of rarefied areas about the apices of roots which I have proven to my satisfaction were not infected, I quite agree with Dr. Brophy in his contention that the extraction of that tooth was not justified as a means of removing a cause for the rheumatism, and I do not think any man accustomed to reading dental films is going to make the mistake of confusing the mental foramen with a rarefied area about the apex of a root.

Dr. Raper: Evidently I have not made my meaning clear. I would like to say that neither the gentleman who just spoke nor myself should be so presumptuous as to say that Dr. Brophy read his radiograph correctly or that he did not. I did not say he misread it, I do not know. But I do know that it is a common misinterpretation to mistake the mental foramen for an abscess and I simply tell you about it.

Dr. Brophy: That is what I thought.

Dr. F. W. Frahm, Denver

I wish to call attention to one or two things that seem to be over-looked in this report, which I think should not be eliminated entirely. That is, we do not recognize the fact that a large percent of the graduates will not locate in cities where they have hospital facilities and the privilege of consultation with specialists in the different lines of our work. Some of these fellows will locate in small towns where time to consider and consulation is not to be had. They will have to act on the spur of the moment according to their own judgement and understanding.

I have practised in two small towns where I was frequently called upon to act as the physicians right hand man. Frequently it was the giving of an anesthetic. The M. D. would call at the door and say. "Come on, I have a very bad labor case, or a curetting case,"—slips us a bottle of chloroform and a mask and says. "Go to it." Well we did the best that we could and trusted the Lord for the balance.

The point I want to make is this: That the advantages given to us who are located in the cities, are denied to these others who are no small part of our profession and they have a right to our consideration and a part in our plans. They are really the M. D.'s

right hand man and many times life is saved because these D. D. S.'s are able to handle the anesthetic and situation. Whether he is qualified by law and his Alma Mater or not. A life has been saved because he developed the ability to do this work. I think that our courses of instruction should be so planned that all the graduates will be able to meet these and kindred situations.

Personally I think it is a mistake to keep anesthesia and physical diagnosis in the chair of oral surgery. These two should be combined and taught by themselves or combined with exodontia. The chair of oral surgery does not have sufficient time given to him to properly train the student in these subjects. The man who has the privilege of teaching anesthetics should also teach physical diagnosis from the anesthetics standpoint. Many times the real diagnostitian on lesions of the heart and lungs is this country D. D. S. A practitioner that needs our sympathy and help. We as dental teachers should give this man all the advantage that we can to enable him to prepare himself for his duties. The course should not be prepared from the specialist's view point. thinking only of the few: But to equip men for the general practitioners work. To equip a man *for* the practice of dentistry and not to specialize him *in* the practice of dentistry is no small part of the duties of dental teachers.

Dr. Moorehead,
(Closing the discussion)

There is not much to be said in closing the discussion, and there is another important report to be read at this session.

I think that Dr. Brophy misinterpreted my meaning, and perhaps I did not make myself clear. I said that surgery was a composite subject made up of anatomy (gross and microscopic), physiology, pathology and bacteriology, plus technique. I simply tried to emphasize the fact that one cannot teach surgery to a man who does not know the subjects of which surgery is composed.

There should be a distinction between the preparation of the student in his work as a general practitioner, and the preparation of the man who will more or less practice oral surgery. The course in oral surgery in a college of dentistry is designed for the first function, but is not designed to fit a man who is going to become a specialist. The general practitioner of medicine has been in the past, and probably will remain to be, the most useful individual in medicine. He serves a greater need to a greater number of people than the specialist. The same holds true with respect to the general

practitioner of dentistry. The man who is practicing either general medicine or general dentistry in the rural community will be obliged, at times at least, to perform services for which he is probably not specifically trained. Under such circumstances he must do the best that is within him, and cannot be criticised in the event of failure. The general practitioner of medicine or dentistry, who, on the other hand, is located within easy reach of every type of specialist, cannot be excused for performing services for which he is not particularly qualified.

Instruction in anesthesia is important. The report emphasizes the fact that from a theoretical aspect the various anesthetic agents should be taught by the department of materia medica and therapeutics. The practical use of anesthetic agents should be taught didactically and practically in the department of oral surgery, which includes extracting, and should also be taught in the infirmary. No student can learn the subject of anesthesia theoretically; he must learn by doing.

The report emphasizes another very important item in the matter of so-called physical diagnosis. We have taken the position that a half baked proposition is bad; that the dentist cannot hope to be anything more than half baked in the matter of physical diagnosis. The interpretation of heart lesions or of lung lesions is a fine art and challenges the best from the expert internist. When it comes, therefore, to the interpretation of lesions of the heart, kidney and lungs, the dentist cannot at any stage of the game be considered competent. The dentist should be sufficiently intelligent so that he may, on the basis of his examination, advise the patient to consult an expert medical man in those cases in which he feels that medical advice is indicated. A little learning is a dangerous thing. The man who knows only a little is always dangerous. The more one learns the more he appreciates his limitations, and the more safe he becomes. Knowing when to stop belongs to the fines arts.

In the matter of radiology, the report recommended in minimum of six to ten hours in didactic instruction with practical clinical instruction in oral surgery and in the infirmary. The student in the infirmary should be taught the necessity of the radiogram in every case in which there is any doubt. It should become in his hands a thing quite as necessary as his mouth mirror. We are not concerned particularly about the conflict that is on with reference to the proper term to be used in designating this subject. I think the terms radiology and radiography are competent.

Your committee tried to emphasize the necessity of presenting principles rather than isolated facts to students. The student who is trained to think, whose mind is developed to a point where he is capable of doing original thinking, is the man who in the end will develop into a practitioner of strong parts, and will get his technique early and well. The student who, on the other hand, simply is taught isolated facts and does not develop any thought life of his own, can never become a man of parts because he cannot think. The student who cannot think logically and connectively cannot grow; his mind is not creative. He goes out into practice and becomes a mere machine; he strikes a dead level and becomes of necessity a bigot. It is the highest function and opportunity of any educational system to develop the thought life of the student concerned.

REPORT OF COMMITTEE ON DENTAL AND ORAL RED CROSS RELIEF WORK IN EUROPE.

At the meeting of the Institute at Ann Arbor, Michigan, a committee was created for the purpose of aiding in the relief of the wounded soldiers of the belligerents in Europe needing the services of dental and oral surgeons. The following named committee was appointed by the president: Executive Committee: Henry W. Morgan, E. A. Johnson, Ellison Hillyer; John F. Biddle, Secretary, 517 Arch Street, Pittsburgh; C. R. E. Koch, chairman, 31 W. Lake Street, Chicago; E. C. Kirk, Philadelphia; J. H. Kennerly, St. Louis; H. C. Miller, Portland, Ore.; D. M. Gallie, Chicago; John F. Biddle, Pittsburgh; E. T. Darby, Philadelphia; Alfred Owre, Minneapolis; B. Holly Smith, Baltimore; E. A. Johnson, Boston; Frank Holland, Atlanta; Frederick R. Henshaw, Indianapolis; H. B. Tileston, Louisville; D. M. Cattell, Memphis; Richard Simpson, Richmond, Va.; S. W. Bowles, Washington; E. H. Smith, Boston; A. H. Hipple, Omaha; Ellison Hillyer, New York; Truman W. Brophy, Chicago; D. H. Squire, Buffalo; H. E. Friesell, Pittsburgh; Henry W. Morgan, Nashville; I. N. Broomell, Philadelphia; H. L. Banzhaf, Milwaukee; J. G. Sharp, San Francisco; G. V. Black, Chicago; W. T. Chambers, Denver; H. M. Semans, Columbus; J. D. Patterson, Kansas City; N. S. Hoff, Ann Arbor; C. N. Johnson, Chicago; H. L. Wheeler, New York; L. E. Ford, Los Angeles; C. R. E. Koch, Chicago; Wallace Wood, Jr., New Orleans; Frank T. Breene, Iowa City; Sheppard Foster, Atlanta.

The chairman consulted with Ex-President Gethro and others, in Chicago, and it was determined to make a canvass in the dental schools of this country and thru them of the dental profession. It was believed, that by making it possible for very small contributors to share in this enterprise, a large amount of money might be secured. To that end the committee ordered little booklets made, each booklet containing twenty coupons certifying that the holder of this coupon had contributed twenty-five cents to this fund.

After the printing had been done one of the coupons was sent to the American Red Cross Association at Washington, D. C., for its approval. Your committee was informed that it had violated the United States Statute forbiding the use of the Red Cross, excepting by those connected with the Red Cross Association, and such firms or individuals as had been using it as a trade mark prior to the enactment of this law. Miss Mable Boardman, the chairman of the association, however, very graciously and kindly overlooked our trespass of the law, in view of the purpose for which it had been done, and advised us to notify the dental profession that it would be better to follow the method of the medical profession and substitute a Geneva Cross with the color of the dental profession. The National Dental Association at its meeting in San Francisco, as a result of the information thus obtained, has adopted the lilac Geneva Cross as the emblem and insignia of the dental profession. The Faculty of Northwestern University Dental School had previously adopted the same as the insignia of the Demonstrators in its Clinic.

The work of the committee was divided by assigning all of the territory east of Lake Michigan and north of the Potomac and Ohio Rivers to the chairmanship of Dr. John F. Biddle of Pittsburgh, Pa.; the territory south of the Potomac and Ohio Rivers and east of the Mississippi River to the chairmanship of Dr. Henry W. Morgan of Nashville, Tennessee; and the territory west of Lake Michigan and the Mississippi River to Dr. Charles R. E. Koch of Chicago.

The necessary stationery was provided for every member of the executive committee, and a very extensive correspondence was carried on all over the country. We regret that the result of the enterprise has not been commensurate with the worthiness of the cause. The responses came in very slowly—the country having been called upon for aid from many other channels.

The total amount received up to date is.....	$1697.25
The expense for printing, stationery and postage....	220.25
This leaves a net balance of.....	1477.00
Of this amount there has been sent to Miss Mable Boardman, the Chairman of the Red Cross Association, for which her receipt is held, and also that of Dr. Anema of Paris, France.....	1000.00
*There is now a balance on hand in bank of..... For the disposal of this amount the Institute's order is desired.	$ 477.00

The committee has on hand a large stock of these coupons—twenty coupons in each book—and if any of the members of the Institute desire to augment this fund at this meeting by additional purchases, we are sure that it will not only be a gratification to the Committee but redound to the reputation of the American Dental Profession especially with its confreres abroad.

* The balance of $477.00 has since been sent to Miss Mable Boardman, Chairman, American Red Cross Association.

The committee desires to give sincere thanks and acknowledgment for the splendid editorials, in endorsement of the Institute's endeavor in this direction, written by the editors of the Cosmos and of the Dental Review.

The chairman asks the privilege of thanking Drs. Morgan, Biddle, Johnson and Hillyer for their energetic and painstaking support and assistance and he begs to call the attention of the Institue to the fact that a year ago the South suffered great financial depression on account of the War in Europe, and that the amount contributed through Dr. Morgan though it may seem small is under the circumstances in reality very generous.

All of which is respectfully submitted.

CHARLES R. E. KOCH, Chairman,
J. F. BIDDLE, Secretary.

DETAILED ACCOUNT OF RECEIPTS AND EXPENDITURES.

RECEIPTS.

Eastern Territory.

Indiana: Through Indiana Dental College	$142.75	
Maryland: Through Baltimore College of Dental Surgery	5.00	
Through Dental Dept., U. of Maryland	11.00	
Massachusetts: Through Tufts College Dental School	87.75	
Michigan: Through Dental Dept., U. of Michigan	15.00	
New York: Through College of Dental and Oral Surgery	17.25	
Through Dental Dept., Univ. of Buffalo	25.00	
Through New York College of Dentistry	213.50	
Ohio: Through Dental Dept., Ohio State	5.00	
Through Cincinnati College of Dentistry	5.00	
Through Western Reserve Univ. Dental School	5.00	
Pennsylvania: Through Dental Dept., U. of Pittsburgh	108.25	
Through Dental Dept., U. of Pennsylvania	5.00	
Through Philadelphia Dental College	10.00	
Through Medico-Chi. Dental Dept	15.00	
Virginia: Through Medical College of Va., Dental Dept	4.00	
		$674.50

Southern Territory.

Tennessee: Through Vanderbilt Univ. Dent. Dept	$ 67.00	
Through Univ. of Memphis Dent. Dept	5.00	
		$ 72.00

Western Territory.

California: Through Univ. of Sou. Cal. Dent. Dept		$ 25.00
Colorado: Through Dr. M. R. Howard, Denver		1.00
Illinois: Through Chgo. Coll. D. S. Students and Faculty	$ 82.00	
Through U. of Ill. Students, Dental Dept	21.00	
Through U. of Ill. Faculty, Dental Dept	40.00	
Through Northwestern Univ. Dental Dept	147.50	
Through Northwestern Univ. Fac. Dental Dept	151.00	
Through Chgo Dental Society	100.00	
Through Chgo Dental Society Members	83.25	
Through Ill. State Den. Society Members	61.75	
Through Winnebago Co. Dental Society	5.00	
Through Mr. Harry Bosworth	5.00	
Through S. S. White D. M. Co. Sales of Coupons	9.50	
Through S. S. White, Jr	10.00	
Through Mr. Hamilton, City Press Reporter	.25	
Through Dentists in Stewart Bldg., Chicago	20.00	
		$736.25
Iowa: Through Univ. of Iowa Dent. Dept	$ 5.00	
Missouri: Through Washington Univ. Dent. Dept	125.00	
Nebraska: Through Creighton Univ. Dent. Dept	43.50	
Oregon: Through North Pacific Dent. College	5.00	
Texas: Through Dr. Field Farrar, Ft. Worth	5.00	
U. S.: Through Navy Dental Corps—Dr. Ronald Barber	5.00	
		$950.75

RECAPITULATION.

Eastern Territory	$674.50
Southern Territory	72.00
Western Territory	950.75
	$1697.25

EXPENDITURES.

Western Bank Note & Engraving Co.—		
Printing Coupon Books	$142.00	
Printing Stationery	30.00	
Dental Cosmos—		
Reprint of Editorial	8.00	
Postage, Express and Exchange	12.50	
Postage and Express	5.75	
Stenographer	22.00	
		$220.25
		$1477.00
Paid Miss Mabel Boardman, Chairman American Red Cross Assoc...		1000.00
Balance on hand		$ 477.00

C. R. E. KOCH, Chairman.
J. F. BIDDLE, Secretary.

REPORT OF COMMITTEE ON ANATOMY, HISTOLOGY AND PHYSIOLOGY.

In presenting my report I shall make no apology for consideration of matters in connection with the four-year curriculum, for in the request for appointment of the committee it was definitely stated that the committee was expected to consider these subjects from the standpoint of the four-year curriculum and suggestions of changes advisable in the curriculum limited to the four-year course, both as to preliminary requirements and time.

In this report with reference to anatomy, histology and physiology, it seems to me that one of the most important issues which faces dental teachers and the reorganization for the four-year curriculum, is expressed. Dental education stands at a very critical time. Dental education has enormously increased the scope and detail of every department. Consequently each department has been adding, adding, adding, and now it has come to the point when all men realize that the number of hours, the number of subjects, in the curriculum, have been enormously overloaded. The dental curriculum is, then, face to face with identically the same problem which faced the committee of one hundred who considered the reorganization of the medical curriculum in the last few years—the enormous overloading of hours and the necessity for the recognition of fundamental subjects.

Before we go any farther in this consideration, I want to go back with a little retrospective view of the development of dental education, for fear I might seem to be a little more radical than I am.

If you will go back to the beginning of dental education and the establishment of the first dental college in this country, you will find that the courses consisted of didactic instruction for two years, the repetition of lectures in two successive years, the same lectures being given, and the practice in an infirmary. I remember very well my father's expressing his experience years ago in dental college, when he said that the professors lectured to them from the platform, and in the infirmary they were allowed to practice. In those days the technical instruction was really dependent upon the preceptor. But the didactic instruction given was of such a character that it raised up a great body of professional men. We might name them all over the United States—men inspired with a professional spirit, with a spirit of study, and with the desire to apply that study to their every-day performance. I sometimes think it was perhaps because they had to work out that application themselves, they did not have it pointed out to them. Now, that body of men in their development realized perhaps the deficiencies of their own technical training, and the result, through the leader of them all, was the beginning of operative technics, prosthetic technics, the organization, the development, of technical instruction in dentistry. And the result of that organization of technical instruction in dentistry was the development of the American dentistry of which we are so proud—*not* the American dentistry of which we are ashamed.

But, the very emphasis upon that technic and the placing of that technic in the freshman year, had exactly the effect it must necessarily have had psychologically upon the professional subjects, because the mind grasped quickly and was eager for the procedure which it saw and which was demonstrated, and avoided the mental effort of study. And the result was the building up of men who were technically more skilful than their teachers, but alas! had not carried with it the same professional spirit. Now as a result of that we are reaping a harvest, and I want to say that we are not always perhaps going to be as proud of American dentistry as we have been in the past.

A year ago last June I was walking through the streets of a little town in Italy, my mind too much occupied by things that had been forced upon my attention to pay much heed to my surroundings until a handbill was thrust into my hand, and I recognized the typical "dental parlor" ad. with the typical plate and bridge, and the only words that I could read were those in flaring red

letters, "American System." Now, as that thing spreads, we are not going to be so proud of the expression, "American Dentistry." As that comes to be recognized abroad as the typical American dentistry, we will not have the same reasons to feel pride which we have had in the past.

Following the development of technical procedures, has come among many schools the development of that which has been well spoken of here today, clinical instruction. Making the clinic, not simply the place for the student to practice, but a place where clinical instruction was given, not only in the technical procedure, but in the development of the professional judgment which should be back of the technical procedure, has been referred to today by two or three speakers in connection with prosthetic dentistry.

And now through circumstances which have developed practically outside of the dental profession, we are forced to face the necessity for the development of the fundamental sciences. Whatever may be said by any one, it is necessary for the dental profession to face as they never have faced before, the relation of mouth conditions to systemic conditions. It is necessary for them to be qualified to have intelligent judgment upon grave systemic conditions and to be thoroughly posted upon the pathology of dental tissues. At the present time the dental profession is absolutely taken with pathology. Dentistry at the present time, taking the whole profession, must be considered as a purely mechanical and technical procedure. That may sound like a radical statement, but I am willing to back it. There is a fundamental antagonism between technical instruction and theoretical instruction, and that is a problem which faces the men in charge of these three departments perhaps more than any other men on dental faculties. Students go into the prosthetic or the operative technic laboratory and their work is all within the walls of that laboratory. They are not expected to study in preparation for that laboratory work. A student comes into my laboratory, and unless he has studied in preparation for that laboratory work he cannot perform it. If, preceding three hours' laboratory work in histology, those men have given that subject one-half hour's careful, studious thought each day during the six other days of the week and come into the laboratory with the knowledge gained from that study as preparation for what they are to do, they may accomplish something in the laboratory. But when they come into that laboratory without having given the subject one single moment's consideration, to pass

three hours in a more or less pleasant occupation, they might better be out getting the fresh air, because they cannot get anything out of their work. They do not get much out of it.

I was interested just now in the remark made that the surgeon requires the study of anatomy, diagnosis, and, lastly, technic. They do not put the surgeon to studying the technic of surgical operation in the freshman year, and teach him anatomy and diagnosis in the senior year. But the dental teacher puts the freshman in the technic laboratory to do things, the reason for doing which he does not know, nor their meaning, and tells him why he does it afterwards, and then we don't know why we cannot succeed in making students!

From the standpoint of these three subjects, which are the fundamentals of medical education, it would be better if the dental student did not see a technical dental laboratory for either operative or prosthetic dentistry until the third year of his course. And I am almost willing to say that if we are honestly to attempt to face the difficulties which present themselves to us at the present time, and to overcome them, we must be perhaps more radical in some things than we will be in ten years from now. We have a condition which has to be overcome, and in order to overcome it we shall have to do some things that we will reverse afterwards.

For the preliminary requirements for the study of anatomy, physiology and histology, at the present time, from the educational standpoint, we have no standards. It is a fundamental educational principle that, in order to do certain things, certain other things must be mastered first. For instance, you ask a college man about the teaching of college physics, and he will tell you that you cannot teach a man college physics until he has studied trigonometry. Because the very thing he has to use in the study of college physics is trigonometry, it is impossible to study physics without a prerequisite of that subject. And it is equally impossible to teach medical or dental anatomy, histology and physiology to a man who has had no scientific preparation, and we may have men entering with the full requirements of a high school graduate who have had no biological training. Not only that, but it has been said here several times today that these preliminary requirements should be delegated to the secondary school. But as the secondary schools are today, or as they will probably be to an indefinite period in the future, there is a vast difference between elementary science in the secondary schools and elementary science in the colleges. Talk

with any one experienced at all in college affairs and you will be told that of the men who attempt advanced chemistry in the freshman year in college on the basis of a high school course in chemistry, a large percentage drop back to the elementary course before the beginning of the second semester. They cannot carry the advanced chemistry. The elementary chemistry of a college course covers as a rule within the first two months the entire ground covered in a year of high school. The work is upon a different level because there is a different expectation of accomplishment and a different attitude on the part of both student and teacher towards the subject.

In medicine or in dentistry, the biology of the secondary school does not take the place of the biology of the college; the chemistry of secondary school grade does not correspond to the college grade, and the proper handling of these subjects from the standpoint of the professional school requires a preliminary training in biology, chemistry and physics of college, not secondary grade.

Failing in those preliminary requirements, it is absolutely necessary for the man who teaches anatomy, for the man who teaches histology, for the man who teaches physiology, to teach also general biology, which does not belong to his course. And you cannot do two things at the same time. You have a definite amount of time for histology, and if you have to spend half of that time on elementary biology, you cannot cover the histology as it should be covered.

In view of the proper preliminary requirements, then, if in the four-year curriculum the first year requires the study of biology, physics and chemistry, the amount of time in the teaching of histology, anatomy and physiology can be reduced in hours and increased in scope. Instead of being unable to give the student anything which makes a real impression upon him as an individual, you will be able to give him more in less time because of his preparedness to take it.

In the four-year curriculum, then, from the standpoint of the acquirement of anatomy, histology and physiology, the first year should contain biology, chemistry and physics.

If possible, in my opinion, it would be very desirable that in the study of biology there should be work in mammalian anatomy, which would shorten the necessary work on human anatomy for the dental student. For many years I have strongly advocated the idea that the dissection of muscles, nerves, blood-vessels, and viscera,

should be done upon mammals, so that the student may acquire a knowledge of the anatomy of the mammalian body as a biological problem, and then the dental student should not dissect an arm or a leg. As it is our anatomical material, which is rare and valuable, is mutilated and wasted by men who gain nothing out of it because they have had no experience in dissection before they come to it, and they are not capable of working over it to their own satisfaction or to anybody else's.

Anatomy, then, belongs in the second, third and fourth years of the dental curriculum, following the biology of the mammalian anatomy of the first year. It should, of course, consist of a general systemic course in anatomy, followed by the anatomy of the head and neck, upon which the greater proportion of the time should be spent.

The anatomy of the head and neck should come in the third year of the dental course, and in connection with oral surgery, either as such or under the anatomical department where more or less surgical anatomy is always taught, or should be. And more of it should be taught, perhaps not more in actual time, but with better system than at the present time.

I am not going to make a definite recommendation as to hours. This would be absolutely foolish. It does not make any difference to me, as a teacher, how many hours you give me for my class in histology, provided it is a fair proportion. The tendency has been to make too many hours in all subjects,—I mean for class-room performance. The total number of hours should be cut down. The problem which we should consider is primarily the proportion of time. Upon the basis of 1,000 hours a year, which is the limit that should be considered there might be: 128 hours in the second year for systemic anatomy, 134 hours in the third year for anatomy of the head and neck, and 94 hours, perhaps, in the senior year for surgical anatomy either under the department of oral surgery or the department of surgical anatomy.

Histology requires the same preliminary training in biology as does anatomy. I am going back just a moment to say what I mean: It is better that the student has had a careful course in descriptive botany, descriptive zoology, that which is usually called general biology, as a secondary course in high school. What the student needs in that preliminary biology is to be trained in observation. That training is a fundamental of scientific study. One of the mis-

takes of secondary school training has been the tendency to attempt to do college work in the secondary school.

Histology should follow a certain amount of work of collegiate grade in general biology, in which work a student acquires some knowledge of the principles and structures of living things. Without the fundamentals of biology, human histology cannot be taught so that it will be of any actual value to the student. He may read the names of the layers of the stomach, he may learn the names of the coats forming the artery wall, but he does not get any knowledge of the structure of those organs which pictures to him their biological function, unless he has back of that study of cell arrangement some fundamental biological conceptions, which cannot be given to him in the course of histology without taking time which he should not be called upon to give. The course in histology should have these things back of it and should be devoted to the study of the minute structure of the organs of the body with reference to their function, so that a student in that course in general histology (which should come in the second year of the dental curriculum), would be able to reconstruct his working ideas of the human body in the terms of the structural elements, the cells of the tissues. The scope of this should include the general system, probably doing very little on the nervous system except in relation to its general plan of construction, or upon the organs of special sense. It would require 128 hours during the year, and with the preliminary training given in that 128 hours well grounded men in histology could be turned out.

The method should be the laboratory method, and by the way, this applies to anatomy as well. There is but little room at the present time for the lecture method in the teaching of either anatomy or histology. There is some need for students of these branches to have some man stand up before them that can make them see, some man that can present the subject to them so that it appeals to their imagination and so they may build up a real mental picture of the working relation of the structure and function. But that should be limited in time and should be done in the laboratory itself with the specimen before the student, not in hour periods of lecture. That applies to both general anatomy and special histology.

The general histology should be followed by a course in special dental histology in the third year of the curriculum. The subject matter of that course should be the minute study of the tissues of the teeth with reference to the procedures of operative dentistry.

and of the structure of the soft issues of the mouth with reference to dental pathology and the etiology of disease. It corresponds to the special pathology of the eye that the oculist must study, the special histology of the ear which the specialist of the ear must study; and to the special histology of any organ any other specialist must study in acquiring the necessary knowledge to pursue a medical specialty. It is, however, more important to the dentist than are either of the others to the medical specialists, for his very technical procedure is gauged by the measure of his intellectual concept of the structure upon which he works.

The dental histology should not come in the same year as the general histology because it requires the development of the microscopic technic and interpretation which has been gained in a year of general histology, leading to the study of the tissues of the teeth. For the teeth involve some of the most difficult problems of microscopic interpretation that we can come in contact with, and it requires microscopic training to study the dental tissues and intelligently draw conclusions from the observations.

128 hours will cover the work on the dental histology, including dental embryology.

Physiology. In order of sequence, physiology necessarily calls for a knowledge of both anatomy and histology, and the more advanced chemistry and physics that are necessary for the study of either histology or anatomy. So that, in a logical pedagogic order, physiology should be a little behind both anatomy and histology. Consequently the major work in physiology should be done in the third year of the curriculum if possible. If not, in the beginning of the second semester in the second year, not in the first semester of the second year. It should constitute a systematic course in human physiology. Lectures, recitations, perhaps three hours a week, 96 hours in a year. But the time has passed when physiology can properly be taught only by didactic work. Unless that course is supplemented by a practical course in the physiological laboratory, the value of it will be very small. It must be accomplished by at least two hours each week through the same length of time, which would amount to 64 additional hours in the physiological laboratory, the work in the physiological laboratory following step by step the work in the lecture course.

Now, while I have mentioned hours, I want to say again that the hours are not so important as the percentages of time. And hours, as the matter stands today in the dental curriculum, are abso-

lutely useless because of the general attitude of mind of the dental student, and because of the impossibility (or the difficulty if you please to put it more mildly) of forcing the student to study the subject before and after his laboratory period.

The problem which confronts the dental profession in the organization of the four-year course, is the problem of making men study and making men think instead of coming and doing things more or less like parrots. And if we are going to overcome that difficulty we shall have to move back for the present, the technical courses in operative and prosthetic dentistry TAKE OUT OF THE FIRST YEAR and if possible *out of the second* year. For two years train men to think, before you teach them to do.

F. B. NOYES, Chairman.

DISCUSSION.

Dr. A. E. Webster, Toronto

This is an exceedingly interesting subject and has been very well presented. I have had no opportunity of knowing in what direction Dr. Noyes intended to give the subject his attention. The whole matter sums itself up in about this fashion, if I may illustrate by a circumstance which I noticed when a boy: Two men were in a field mowing with the ordinary scythe, the bell rang for dinner, and the men made a wager as to which could cut his swath to the other side of the field and get home to dinner first. One man decided he would sharpen his scythe first, the other man said to himself, I will try it with a dull one. The man with the sharp scythe arrived first, he waited only long enough to sharpen his scythe to win; the other man's scythe became so dull that he never got through until he did sharpen it.

That incident well illustrates the point I wish to make. The man who sharpened his scythe might have sharpened too long and never got through either. So it depends on how long we let the student sharpen his wits, for if he tarries too long he may never arrive, while if we start him off in dull condition he will never arrive either. Therefore it is a question of judgment as to how much sharpening we shall do. There may be some little change, for instance, in our attitude as to what an education is according to some modern views. Certain modernists say that it is not an education which is really fitting a man for his life's work, while other says, Train him mentally, educate him, and then he will be able to do the work all right.

Limit them both. It may be true that we have developed the mechanical to the disadvantage of the purely mental education, but, dear knows, our mechanical training is not up to much. There could be a vast improvement in that. Some of us do not realize that each department of dentistry has added a great deal of mechanical requirements in the last few years. Anybody who has studied filling materials knows that at one time we had a great deal of trouble in learning how to put in gold fillings and amalgam fillings, and we were not called upon to use any other kind of filling material. But you all know the many different kinds of fillings we have to put in today, and we have the added necessity of teaching when to use each of these. So we have to sharpen the scythes. It is not so simple as it used to be. Formerly it was either gold or amalgam, only two to choose from, while now it is about ten.

It was stated by Dr. Noyes that we taught operative technics and prosthetic technics without giving any reason to the student why he made these technical procedures. That may be true where some man stands up on the rostrum and pours out eloquent lectures on the subject, and some young instructor lets the students loose in the laboratory while he stands around and they work at whatever they like. What Dr. Noyes says might be true under those circumstances. But that is not the way either of those subjects are taught today. They are taught as laboratory courses, and the lectures are given just when necessary in the laboratory, as was suggested in connection with the subject of histology. That is the way to teach these subjects, when the reasons may be given.

I quite agree with Dr. Noyes when he says that there is more anatomical material wasted in the study of anatomy than there is used. To start a boy into an anatomical department to dissect without any preparation for dissection is a waste of the material, as well as of the time of both student and teacher. It is far better to give preliminary training on rabbits and guinea-pigs, which are cheaper. In our school we have followed the plan of giving at least a month to six weeks of preliminary training in the first year in dissections of rabbits and guinea-pigs. That is preparatory to the histology, preparatory to the anatomy, and preparatory to the physiology. The student takes his general histology during the first year, his special dental pathology in his second year prior to introduction to operative dentistry, and just before his introduction to operative dentistry he is given a course on botany and zoology, which prepares him for understanding dental caries. We do not

want to discuss dental caries with him until the next session. We discuss it within three days of completion of his former course so that we may apply at once what he has been taught.

In general anatomy, osteology is taken in the first year, dissecting in the second year as laboratory courses, and surgical anatomy in the fourth year. Physiology is taken in the second year and third year after the completion of preliminary biology and histology, and, of course, anatomy.

It is interesting to listen to discussions of the four-year course, and I presume there will be a time set apart for a full discussion of this subject at a later period. In preparation for that discussion, I would suggest that the committee prepare a sheet which may be hung upon the wall with all the possible subjects that might be in a course in dentistry and used after Owre's example of what time you would apply to it and work it out in percentages. Never mind about hours, which simply serves to make the matter confusing. There are too many figures and compilations and hours. Let it be worked out in percentages and leave plenty of columns for readjustment, and I believe we could get from this audience in fifteen minutes a consensus of opinion as to the amount of time we would put on each subject.

There is no use in my saying that Dr. Noyes is all wrong, that 128 hours in histology is all wrong. I say I want 300 hours in dental anatomy. Another man says that 94 hours is plenty. I do not know but he has his dental anatomy mixed up with operative dentistry. So it is difficult to get a conception of the matter unless we have it before us all at once. If the committee saw fit to make such a draft I believe we could study it together at least.

Dr. Noyes,
(Closing the discussion)

I have nothing to add unless it be to say that I still think that the difficulties in technical instruction, which have been referred to a number of times, have their solution in the same direction as the solution of this troublesome problem of the teaching of anatomy, histology, and physiology. In other words, that the mind must grasp before the fingers can execute: the student must know what he wants to do before he tries to do it. Anything which the student learns from demonstration over a patient becomes the performance of an imitator, a mechanical procedure.

REPORT OF COMMITTEE ON CHEMISTRY, METALLURGY AND PHYSICS.

Since it has seemed impractical for this Committee to meet and formulate a report on the subjects assigned, the writer desires to present one on his own responsibility trusting that the other members will present reports of a supplemental or other nature that will aid in bringing out a thorough discussion of the subject that may be put into form later.

At a meeting of this organization in Chicago in 1912, the writer discussed the subjects of physics and chemistry essentially as follows:

"The subject, Applied Physics and Chemistry, implies the use of the discoveries of general physics and general chemistry, in connection with special observations, to explain the phenomena accompanying the manufacture and use of the materials used in the practice of dentistry. General Physics, briefly speaking, is the science that treats of forces and forms of energy. And, General Chemistry the science of the composition of things, and the changes which they undergo in consequence of changes in their ultimate composition. It would seem, on casual observation that the two sciences were inseparable, though on closer scrutiny it may be seen that chemistry has more to do with specific properties, while the accidental or arbitrary properties are the province of physics. Any profession, business, or trade which has to do with any one of the three states in which matter exists (solid, liquid, or gaseous) must make use of some of the principles in physics and chemistry. Up to the present time, however, the principal branches of physics are astronomy, meteorology, geology, magnetism, mineralogy, mechanical, electrical, civil, and marine engineering. And, of chemistry there are an equal number of branches, though the principal ones are chemical engineering, pharmacy and medicine. Mechanical and chemical engineering seem to offer some grand suggestions for us, for these courses are largely Applied Physics and Chemistry.

For example, in mechanical engineering, under the head of "design of machine tools," the student must design machine tools, calculate the magnitude and direction of the forces acting on them, and proportion them to resist these forces. Under the head of "theory of machine design," the materials for every part of machines and machine tools are considered extensively. Under the head of "mechanism and graphical statistics of machines" the student takes up the theory of machine movements, with practical

application to gearing, linkages, parallel motions, belting and trains of mechanicanisms, including the determination of forces and reactions, and the efficiency of machines. This same plan is carried out through several other courses covering power, power plants, power transmission, heating and ventilation, hydraulic machinery, water turbines, steam turbines, etc.

In chemical engineering such manufacturing processes as destructive distillation of coal and wood with recovery of by-products, illuminating gas, starch, glucose and sugar, fats, oils, soaps, bleaching and dyeing, tanning, paper manufacture fermentation and distillation are studied in detail. Fuel and refractory materials are taken up in much the same manner. The metallurgy of the ferrous compounds as well as the non-ferrous ones are also treated in much the same manner. And, this is but a part of what is given in either of these courses. Of course, much of this has no connection with dentistry, but some of it has, and all of it goes to show to what extent physics and chemistry are being applied to other pursuits with the result that men equally scientific with the medical profession are being made. It seems to the writer that if every material and every process involved in the practice of dentistry, *that is not allied closely with the practice of medicine*, were incorporated into a course called Applied Physics and Chemistry (Chemistry of Metals or Dental Metallurgy) and formulated upon much the same plan as the present courses in chemical and mechanical engineering are, we would have taken the first step towards affiliating a part of dentistry with courses more closely allied than Medicine. In order to carry out such a plan the student must be prepared equally well with the students in engineering, the teachers of these subjects in our schools must be prepared in a like manner, and the schools must have equipment for research and demonstrating purposes.

Some of you may say that you are giving an excellent course in Dental Metallurgy and that these assertions, that we are not applying all our chemistry and very little physics, are not wholly true; but, in reply I want to urge that there is nothing that will substitute for physics if you have to prepare men on broad lines for mechanical pursuits."

As I have pursued the study of the needs of dental students relative to physics and chemistry, I have become more and more convinced that the statement, "Nothing can be substituted for physics in the training necessary to make a scientific man" is not

an exaggerated one. My views have not changed regarding the matter presented four years ago. My convictions have led me to enlarge upon these subjects each year since. As the time is approaching when we shall have another year added to the course for the further development of our students, we are planning to enlarge upon these subjects still more,—first by the introduction of a good course in physics, and second by supplementing the course in General Inorganic Chemistry with one on the subject of Chemistry of Metals. It is not our desire to do this at the expense of generally acknowledged preparation necessary to know medicine, nor with a view of separating mechanical dentistry from the healing art, but rather to correct an apparent defect in the performance of our duties as teachers after students come into our hands. Dr. Kirk had this to say in discussing the paper referred to relative to the character of the students' preparation previous to entering Dental Colleges, viz:

"It is undoubtedly true that the men who come to us are deficient in training in the fundamental sciences of physics and chemistry that underlie our professional work, so deficient, indeed, that they are unable to profit by the instruction which is supposed to be based upon the application of these sciences to their needs as dental practitioners."

If that is the situation, I want to call attention to a feature of this matter that has interested me for many years, and that is the relation of our teaching body, taken as a whole, to the question of preparatory education. It probably has been the experience of every university as an institution that whenever a demand is made for advancement, with reference to the character of preparation required for admission to any of its schools, that demand has been met, not immediately perhaps, but in the course of time, by the preparatory schools on which the institution draws for its new student material. We have had unlimited instances where the institution of higher learning has placed the standards of educational efficiency for admission to its departments on a plane higher than that which formerly obtained, and the reflex effect of that action on the preparatory schools of the community where the university draws its student material is that the preparatory schools adjust themselves to that demand.

Now here we are, a not inconsiderable part of the higher educational machinery of the country, dealing with a difficulty which arises from the fact that the student material that the preparatory

school system is delivering to our doors, the raw material out of which we are expected to make dental practitioners, is not of the right grade to suit our purposes for converting it into the finished product of professional men; and one of the grave defects in that raw material is exactly the thing which the essayist has described so lucidly in his paper and it is true not only of physics, but of chemistry.

I do not suppose it is necessary for me to reiterate here what I have said so many times to dental audiences, that it is my belief that elementary chemistry and elementary physics should be taught in our preparatory school system, at least from the grammar grades up.

How shall we correct these conditions? A mode of correction has been suggested by the essayist, but it somehow reminds me of the remark of a western editor with reference to the broad problem that was discussed some years ago in the newspapers, "Is marriage a failure?" After the question had been discussed pro and con for some months, one man settled it by saying, "Well, it may be a failure, but it is the best arrangement we have under the circumstances." Perhaps what Dr. Ward has suggested here may be the best arrangement under the circumstances, but I am asking you to go deeper and to realize the importance of your own position as teachers and the weight of influence that this organized body could, if it would, bring to bear on the question of a better, more thorough preparation in elementary physics and elementary chemistry by the preparatory school system. If we could make it manifest to the school authorities that the material left at our doors for developing into professional men is not fitted for the purpose, and demand something better, I think if we put our emphasis on that demand strongly enough, we will begin to realize for our dental schools the same results that the larger institutions of learning have constantly realized in raising the requirements made from time to time for admission to their several schools.

This discussion of the subject in question by Dr. Kirk seems to make clear our duty in demanding better preparatory education by the different educational institutions of the different States. This year's freshman class at our school numbers 139. Of this number 14 came from departments of Universities and colleges with advanced credits in Chemistry making it unnecessary for them to take Chemistry after enrollment with us; 19 came to us without having had elementary Chemistry in the High School. Of the 125 in the

class who needed instruction in Chemistry 19 seems entirely too high a number to have come from the High Schools without having had elementary instruction in this subject. Since these students who have not had elementary chemistry in the preparatory schools came from no particular section of the country, there appears to be no reason for assuming that other schools do not have the same condition, relative to faulty work on the part of the preparatory school, confronting them. If this is true, it seems that there should be united effort in demanding good courses in physics and chemistry from the preparatory schools for students in dentistry.

The question that seems to be of prime importance in the performance of our duties as teachers after a student has been properly prepared is, "are we all in a position to make use of this preparation in the broadest possible way?" Can we all teach chemistry and physics with a view of giving the student a broad foundation, or must some teach the subject from a dental standpoint accomplishing little more than the accumulation of a few physical and chemical facts that enables the student to meet State Board requirements.

As pointed out in the paper referred to, we are working towards a wide view of these subjects by the teachers of Chemistry, and a more general application of them by the strictly dental teachers. The task has not been easy of accomplishment in the past, and we do not anticipate an easy adjustment of affairs in the future, but we are concentrating our efforts towards this end.

The subjects of General Inorganic Chemistry, Qualitative Analysis, Organic Chemistry and Metallurgy that we have been teaching in the three-year course have been as follows:

General Inorganic Chemistry, lectures and demonstrations 4 hours a week for 17 weeks and 2 laboratory periods of 4 hours each, every week for 17 weeks. Total teaching hours, 204; credit, 4 hours.

Qualitative Analysis, lectures and demonstration, 2 hours a week for 17 weeks, and 3 laboratory periods of 4 hours each, every week for 17 weeks. Total teaching hours, 238; credit, 4 hours.

Organic Chemistry, lectures and demonstrations 3 hours a week for 17 weeks. Total teaching hours, 51; credit, 3 hours.

Metallurgy, one lecture a week for 16 weeks. Total teaching hours, 16; credit, 1 hour.

While we are not quite certain about the exact number of hours devoted to teaching, we expect to teach previous to, or simultaneous with, General Inorganic Chemistry, a course in Physics consisting

of not less than 4 lectures and demonstrations a week for 17 weeks, and two laboratory periods of 4 hours a week for 17 weeks. Total teaching hours, 204; credit, not yet determined. Subjects probably covered: Mechanics, sound, heat, magnetism, electricity and light. We hope to have this course precede General Inorganic Chemistry, but, as it appears to us now, it will be necessary for us to give it during the first semester of the Freshman year at the same time that General Inorganic Chemistry is taught. Following all other Chemistry except Physiological Chemistry and Physiology, we are planning to enlarge the course now known and taught as Dental Metallurgy from one hour each week to four hours each week for 17 weeks, and probably designated as Chemistry of Metals. One reason for increasing the time of teaching this course is because a close study of the teaching of the subject of Inorganic Chemistry reveals that most teachers are unable to teach the Chemistry of Metals along with the Chemistry commonly taught on acids, bases and salts. It is possible that we will designate this cause as Dental Metallurgy. My preference at this time, however, is to call the course Chemistry of Metals because I believe it should be taught more after the commonly accepted methods of teaching Chemistry than the present widely taught methods of presenting Dental Metallurgy by lectures and laboratory work on Dental alloys, cements, etc., which represent some of our most intricate Chemistry. This manner of presenting the subject in my opinion consumes a great deal of time and results in the accumulation of information rather than acquiring an education along this line of work.

MARCUS L. WARD, Chairman.

DISCUSSION.

Dr. E. C. Kirk, Philadelphia

I desire first of all to commend the progressiveness of the program committee in announcing this discussion on my part even before I knew I was to be here; for as a matter of fact, I did not know that I should attend this meeting until after I received a copy of the program and found I was announced to open the discussion of this paper. I have no doubt this same progressive committee already has this discussion set up in type for the Transactions.

Let me say in beginning the discussion of this admirable report, that there is no subject in the dental curriculum upon which I find my mind more in a state of confusion than that which Dr. Ward

has brought out; that is, confusion as to detail though I feel reasonably clear as to the principles involved. We have for a number of years been faced with a difficult problem in dental education that has driven us to the lengthening of the time of the curriculum. That difficulty has been the over-crowding of our three-years' curriculum with data that we have all agreed is necessary for the dental practitioner to know before he is fitted to enter upon practice and, we have said we must have time enough to teach the student all that he should know to make him an efficient practitioner, therefore we have agreed that we must lengthen the time. Now the problem before us is to so utilize that time that we shall be able to develop the highest efficiency in those whom we send out as practitioners. And the great difficulty with all these subjects of the curriculum, and I think it is especially so in regard to the physical sciences, is that the temptation is to become diffuse in our teaching and not concentrate upon the things which really make for efficiency.

In practically all our subjects we have two aspects of our teaching problem. We have to know our subject not only by what it is, but by what it is not. To illustrate, I may relate an incident that occurred to me that was quite impressive. Some years ago I went to the little town of Homer in Western New York where I had occasion to transact some business with a resident there. And not knowing exactly where he lived, I spoke to a man on the street and upon asking him to direct me he said, "Do you see the big white house on the corner?" "Which one?" "That large one there with the big bay-window in the top?" "Yes, I see that," was my reply. "Well," he said, "that ain't it. If you go on beyond that some distance, and take the first turn to the left you will reach it." He had concentrated all my attention on that big white house, I was trying very hard to remember his directions, but the principle thing in his instruction to me, the focal point on which I had concentrated my attention, as is often the case in the education of men, leads to the same conclusion of "that ain't it."

I think we have a great deal of that tendency in our instruction with reference to physics, chemistry and metallurgy. We are teaching our students a great many things that "ain't it," in order to get at the kernel of truth that they need most in their dental education.

In a text-book which I have in mind, one of the first problems that is given is an experiment illustrating the decomposition of a

compound of two gases by one of the alkali metals. A piece of sodium is dropped upon the surface of water, a sizzling evolution of gas occurs and the element sodium disappears, the experiment is repeated and the gas evolved from the decomposition is collected and shown to be hydrogen, and the water is tested and found to be changed in character by its reaction to litmus. When you make such a demonstration as that before a group of green dental students, the majority of whom have not studied chemistry, it is all new to them and they know nothing and care less about the physical properties of sodium as it will be taught later on, and they wonder what all this has to do with dentistry. But the principle developed is most important and ought to be understood and remembered.

It seems to me that in the instruction of a dental class, that same principle underlying the decomposition of a binary gaseous compound by a metal could be much more efficiently and convincingly brought home to the mind of the dental student if we should demonstrate it by decomposing such a compound as hydrochloric acid with zinc. The principle is the same as in the sodium and water experiment but we use hydrochloric acid in dentistry, we use zinc as a metal, and we use the decomposition product or the zinc chlorid. All these things the student must be familiar with afterwards.

We should endeavor to make our courses selective in such a way as to demonstrate the things that the dental student needs particularly to know—that appeal to his later experiences and with which he has a sympathetic mental relationship so that he will absorb his teaching more readily and retain it indefinitely.

As I have already stated, I am experiencing a confusion of mind in regard to this matter. My confusion relates to the extent to which we shall go in presenting the data of chemistry, the data of metallurgy, the data of physics, etc. What I am perfectly clear about is that we should focus our attention upon the question of selecting from the enormous mass of data, which each one of these subjects presents, those things that are immediately applicable to our professional needs and that will at the same time be efficiently instructive in training our students in the fundamental principles of these sciences. I think that is the problem before us.

Some time before knowing that I should be here or take any part in the discussion of this subject, I had formulated a letter that I had intended to send to the dean of every dental college in this

country, a questionnaire with reference to dental metallurgy. I should like to turn the letter over to the chairman of this committee and have the inquiry sent out so as to get an expression of opinion from all of the institutions of this country as to what we shall do with metallurgy. I have confined my questions to the subject of metallurgy because I am a little clearer as to the question of physics and chemistry than I am in the matter of metallurgy. In my opinion metallurgy is undergoing a state of flux in dental education; that is to say, we are evolving in such a way that some things which in the early days of our teaching we deemed of great importance, are becoming less so, and other things that previously we knew nothing about are now becoming of more importance. So there is apparently a necessity for change in our treatment of the subject of metallurgy, perhaps more than anything else among the fundamental branches. If you will permit me, I will read this letter because it has a bearing on the subject under discussion, and, as stated, was prepared before I knew that this report by Dr. Ward was being sent in. The letter expresses incidentally my own feeling of doubt about the efficiency of the present teaching of the subject:

"As we have under consideration a revision of our course in Dental Metallurgy, it will greatly aid us in reaching a practical solution of our problem if you will be kind enough to furnish us with a statement covering the following points:

1. What length of time do you assign to the teaching of Dental Metallurgy?

2. What range of data is included in the course?

3. Does your course embody both didactic and laboratory instruction? What number of periods is devoted to each?

4. Apart from the fact that Dental Metallurgy is a recognized feature of the standard dental curriculum, what is your individual opinion as to the extent of training in that subject that the prospective dental practitioner should receive so that his educational efficiency shall meet the standard demanded by modern conditions of practice?

I ask the latter question because at present the dental practitioner is called upon to perform but few metallurgical operations in connection with the conduct of his practice, ample provision being made for his needs in that particular by the dental supply houses, so that the necessity for a course in practical dental metal-

lurgy covering a wide range of data is not so apparent under modern conditions as it has been heretofore.

An academic knowledge of the subject is of course desirable, just as it is desirable that the dentist should have, for example, a clear understanding of the materials which enter into the manufacture of porcelain teeth and the processes involved therein, but he is not required to have that kind of knowledge of porcelain tooth manufacture which was necessary to the older practitioner before the dental supply houses catered to his needs in that respect as amply as they do at present.

In the light of the foregoing, the subject of Dental Metallurgy as a part of the dental curriculum appears to need revision, and I shall be greatly indebted to you for an expression of your opinion on the points herein referred to."

What I have imperfectly tried to express is, what we need is the broadening effect, or, to use the word of our friend the dean of the dental department of the University of Minnesota, we need the cultural effect of a broad conception of the underlying scientific principles relating to chemistry, to physics, and to metallurgy, which a proper study of those things will bring, and we must get that grasp of principles not from a diffuse selection of data, but from the data that we actually require in our own practical work.

I have presented only a rough sketch picture of my own thought in regard to the matter, and I am very glad indeed to have heard this report presented by Dr. Ward because I believe that it embodies, as nearly as I can understand from having heard it first read here, another expression differently phrased of precisely my own attitude of mind in regard to this general question. I only want to issue a note of warning; the tendency to introduce into the teaching of this subject too much of instruction and too much of data belonging to the same category as that which I received at Homer, N. Y., summed up in, "that ain't it." Let us make our instruction utilitarian and at the same time cultural in the sense that it will be essentially scientific.

Dr. Alfred Owre, Minneapolis

The report that has been submitted is excellent; there is very little left to say. There will no doubt be some variation in the number of hours in the different localities, as illustrated in Dr. Ward's report. For instance, there are some universities in which the facilities for giving certain kinds

of instruction are better than they are in some other subjects. In some universities it may be convenient to give to the fundamental branches of dentistry a little more time than perhaps to the clinical phases of dentistry. At first thought it may seem unfortunate that we have these conditions to deal with, yet from another standpoint it is a mighty fine thing. We thus have forms of leaven in the various communities that will react upon the rest of the country.

Let me illustrate in this way: I said the other day that what we want above everything else was to develop efficient men. We will assume that we have an excellent institution endowed by the state, but in a locality lacking in clinical material. That may be unfortunate from one standpoint, but from another standpoint it is an advantage. Such an institution may strengthen its courses along other than clinical lines; it may emphasize its courses bearing on special problems in chemistry; it may strengthen its courses in pathology so that they will have particular bearing upon pathological problems in dentistry. Now, when the men who have received such instruction are scattered throughout the United States, they will co-operate with the men who are teaching the more purely practical phases, and thus work together for great good. So it is not incumbent upon any one section of this country to force its local adjustments upon another. And that is, I believe, why we had such a wise action as that taken in Chicago last June. It was agreed that four years from the time a high school student enters the college of dentistry, he shall have had 4800 hours of instruction, 4200 hours of which shall have been devoted to purely dental subjects, and 600 hours to ancillary subjects. The more we examine the resolution adopted at that time, the more we find there was wisdom in that action. It allows for differences in the environment of schools throughout the United States, and even throughout a wider territory.

Let me illustrate the advantages of this elastic program to a concrete case. The leeway it provides gives opportunity to each student for the development of his native tendencies. We are not all cast in the same mold. If you force an absolutely rigid program down the throat of students all the time, they will swallow it simply for the purpose of meeting certain imposed conditions, as state board examinations. But if a student chooses a subject because he likes it, if he works at it and develops it of his own initiative, that work becomes an ever-growing part of him. We have all seen the tendencies of a boy to develop along the lines of some

game or play which attracted him. For instance, I knew a boy who began to collect postage stamps, and from the interest awakened first by the bits of colored paper grew a curiosity which resulted in a study of geography, history, map-making, etc., of value to him all his life. We may trace the lives of a great many boys who from some similar beginning have gone on to the study of social and political conditions, to artistic development, to an appreciation of the literature of various peoples,—we all have these illustrations. And that is what the program proposed by the various bodies means—that with this leeway students can work together for increased efficiency, in a spirit of whole-souled interest in their work.

Dr. W. H. Welker, Chicago

The report presented by Dr. Ward is of particular interest to me because it happens to fall along my own line of work. I would like to say a few words in connection with it. In the first place, it raises the question of preparedness of men when they reach our institutions. I believe the matter of preparedness can be very nicely solved if our schools will make certain requirements with reference to high school education. The idea that we have men coming into the profession of dentistry who have never studied chemistry in the high school, who have never studied physics in the high school, seems to me to reflect on our dental school entrance requirements. It is perfectly possible for dental students to obtain the necessary preliminary training in the high schools. If we require them to get this training in the high school to begin with, we will do away with the bugbear of having men come to us with absolutely no conception of chemistry or physics. At the University of Illinois, in 1917 our dental students will meet the regular University entrance requirements. This means that they will have preliminary training in chemistry and physics, and that they will have enough mathematics to handle the college physics. So far as our institution is concerned, this particular problem is solved. After 1917, our dental students will have a well rounded preliminary training for the course that they have elected.

In regard to the matter of teaching dentistry from the very start, my own personal experience is a little bit different from that expressed by one of the speakers. In medicine that question has been thrashed out, and I believe the consensus of opinion, to-day, is that the sciences fundamental to medicine should be taught as

sciences, irrespective of the use to which they are to be put later on. Our science teachers are men who are fundamentally trained in these particular subjects, and they are supposed to lay down the broad principles of the sciences. It seems to me to be wrong to try to teach medicine in connection with biological chemistry. There is not enough time in the medical curriculum to teach biological chemistry as I should like to teach it. It seems to me further that, with my imperfect knowledge of medicine, it were folly and a waste of time to spend one-third or one-fourth of the time trying to make practical applications before the students are sufficiently trained to appreciate the fundamentals of this science. The clinical men who are experts along those lines are supposed to teach the applications of the fundamental knowledge acquired under the teachers of the sciences. I believe we are going to have decidedly better instruction under this system than if everybody teaches everything in the curriculum and nothing is taught thoroughly. So from my viewpoint, I believe in teaching the fundamental sciences as scienecs, and leaving the clinical men to make the applications of those principles with which the student has become familiar in his study of the fundamental sciences.

Dr. Ward,
(Closing the discussion)

I have very little to say in closing except that I am very glad indeed to have Dr. Kirk agree with some of the things I had in mind. I think his understanding that we intend to have as much metallurgy as we can use and use it with respect to other things and no more is about right. We do not intend to crowd this course to the exclusion of other things, and we, too, are in a somewhat confused state of mind as to exactly what we should do. At this time my personal opinion is that with the extra year about four lectures and demonstrations will be better than to take one afternoon or two afternoons off for laboratory work, and I have suggested here that we want four lectures a week. Those lectures or demonstrations I think can be added, but I do not want to sacrifice the time that we have available at the present time because we need it for laboratory work.

I am in accord with what Dr. Owre has said in regard to some schools being better able to carry out certain lines of work that some others cannot carry out.

The statement of Dr. Welker I did not understand. What did you mean, Dr. Welker, when you said you took a little different view as to the preparation of students? Did you take it from

the report that I meant we did not need to teach subjects as subjects, as Dr. Kirk mentioned, or did you think I was recommending students to be taught dental chemistry?

Dr. Welker: I was speaking particularly of the correct interpretation of the science as a science, leaving the clinical teachers to make the proper applications of the fundamental principles.

Dr. Ward: My idea was to recommend in the highest terms the teaching of every science as such. We might differ a little in the application of that science, but that is one of the things in regard to which we have to get together; that is, who shall apply those things?

Our idea is to have about three or possibly four men in our school to cover the subject in organic chemistry as regards its application, and we are going to get together and study some chemistry. I see that I cannot in my practical work cover that subject. We must have somebody help us to give that course in what chemical engineers would call applied chemistry. The state boards require it, the profession of dentistry at this time requires that a man shall have purely chemical training, and we are going to make practical use of it.

Dr. Kirk: May I ask Dr. Ward to ask Dr. Welker a question to bring out this point? I think I have started a misconception. Does Dr. Welker take the ground, for example, that for the elucidation by a metal of the principle involved in the decomposition of a binary gaseous compound that the decomposition of H2O by sodium, is any better than the decomposition of HCl by zinc? It is exactly for the inculcation of principles that I am contending, but I want the illustration drawn from something the dentist is familiar with and can afterwards use. I certainly want the "broad swing," and the broad swing means the inculcation of principles; but I want the illustration made from things that the dental student will have a sympathetic interest in, that relate to his experience—that is the point.

Dr: Welker: In answer to this question, it appears to me that it makes very little or no difference what particular thing is used to illustrate that principle. From my point of veiw, Dr. Kirk, I would rather have that principle taught in the abstract, because the student is just as new in dentistry and the materials that are going to be used in dentistry, as he is in chemistry. The whole effort of the science teacher ought to be in the direction of getting the student to appreciate the fundamental principles of the science.

It distracts the attention of the student the moment you refer to dental materials. The men teaching the science usually do not know dentistry, and therefore should not be expected to make practical applications. My belief is that we should first lay our foundation of the fundamentals of pure science and then rear our structure of applied dental education on this foundation. If we try to teach science from two viewpoints we are going to miss out on one viewpoint. That is my understanding of the situation.

Dr. Kirk: In case the zinc application is made, it is not necessary to say to this man, "This is a dental illustration which I am using as a concrete example."

Dr. Ward: I will ask Dr. Welker this: Would you think it better for the man teaching quantitative analysis, to use as a part of his tests and work a dental alloy with five metals, or to take any old thing that came along?

Dr. Welker: From my viewpoint, in the abstract again, it does not make a particle of difference what he uses. When we come to the study of metallurgy, the laboratory work consists of the study of the materials that are used in dentistry. The student by this time has acquired some proficiency in qualitative analysis so he knows what he is doing. He is then ready to study dental materials. In the initial work in qualitative analysis, however, I believe the teaching can be more efficiently carried on in the abstract.

Dr. Ward: That is his test.

Dr. Welker: But he must learn to walk before he can learn to run. When capable of running, by all means hand him the dental materials.

REPORT OF COMMITTEE ON MATERIA MEDICA AND THERAPEUTICS.

Before taking up the subject let us have a clear understanding of what is meant by the terms materia medica and therapeutics. A number of our text-books which treat on the subject are entitled Materia Medica and Therapeutics, and this is especially true with those which are written from the dental standpoint.

This title by no means embraces all that is covered in the text, so we accept the term with a broad meaning, for it implies not only

these subjects in their restricted sense but more or less of all knowledge pertaining to remedial agents and their application in the treatment of disease. It is quite evident that the rational and intelligent use of a remedy is governed by our knowledge of its various properties, both physical and chemical, its local and systemic actions and methods of administration. In order to meet this requirement it is necessary to have some knowledge of chemistry, pharmacy, toxicology, posology and pharmacodynamics. These subjects are so intimately related to materia medica and therapeutics that they are considered part of the subject and are taught as such.

The subject of materia medica and therapeutics as we now understand it comprises a fairly large group of subjects all of which play an important role and are essential if we wish to use a remedy in an intelligent manner.

The subject, however, is not fully appreciated by the student entering into its study and this is especially true of the dental student. This part of the curriculum is considered a bugbear and is entered into with more or less indifference.

Why should the dental student not take hold of the subject with the same interest as the student studying pharmacy or medicine?

I may answer this question in sum and substance as I gather it from the dental student himself.

In the first place, he looks upon his profession largely from the mechanical standpoint and feels that he has use for but few drugs.

He has already seen a certain few employed in the clinic by the instructor and is satisfied with what knowledge he has obtained in this manner.

Again the field in which he is interested is confined to a small part of the body and the therapeutic agents which may be employed in this particular field are limited in number.

It is therefore not hard to understand why materia medica and therapeutics are not given the same consideration as other subjects pertaining to dentistry.

Ordinarily the services of the dentist are sought for the purpose of repairing the organs of mastication which have lost their function through decay. There is however a broader field open

to the dentist and the time is coming when his advice will be sought for the purpose of preventing dental caries and pyorrhea; in other words, a good share of his practice will be prophylactic treatment.

Research in dentistry has just begun to make some very important strides and the field is a promising one for there are so many problems as yet untouched. We must realize that a knowledge of therapeutics and the allied branches will be of the utmost importance in aiding the dentist to meet these problems as they arise. I have mentioned a few of the things which are concerned in order to show the importance of the subject.

The problem which confronts the teacher of materia medica and therapeutics is how to make the subject interesting and, by this means, stimulate a desire on the part of the student to acquire that knowledge which will place him in a position to reason out for himself the proper medicinal treatment for a given case in the same manner he would the treatment from the mechanical side.

It must be admitted that materia medica and therapeutics is usually considered a dry subject, and this is especially true where it is taught as a purely didactic course. Our text-books on the subject in order to be complete include a number of drugs which might be deleted without any great loss, for some of them have been supplanted by others of more value. The author is not to be criticised for their appearance in the text for the book would not be considered complete if they were not mentioned.

If the student attempts to master all that is given in the book it tends to add to his dislike of the subject. Therefore it behooves the instructor to point out the more important part and show how the knowledge concerning it may be applied. The subject should be taught in a broad sense, and I would lay emphasis on this, for the dental student is prone to take a very narrow view of the application of therapeutic agents.

He appears to have his mind centered on only one particular part of the body and that is the oral cavity. This may be in part true of other branches for an instructor in histology informed me that a section of uterus under the microscope was diagnosed and described as an embryonic tooth. The dental student must be taught: that the use of therapeutic agents is for the purpose of aiding nature in the combat against pathologic conditions; that drugs do not cure disease but that they either stimulate the function of certain animal cells whose activity is below normal, or they

depress certain functions which may be over active. Of course we must make exceptions as in the case of caustics which not only abolish function but cause death of tissue; and again in the case of antiseptics and disinfectants which exert their beneficial action through their power of destroying or inhibiting bacterial growth; in other words, they tend to remove the cause when the pathologic condition is the result of infection.

How may one interest the dental student in materia medica and therapeutics so that he will enter into the subject with the same spirit that he does the other branches of the curriculum? I assume that all teachers of the subject have their own ideas concerning this phase of the problem, and I can only give some of the ideas which have proved of value in my experience.

The manner in which a new subject is presented may make an early favorable impression which is one of the things most desired. With this object in view I have found that an introductory lecture which outlines the value of the subject and embraces some of the practices in vogue, and the therapeutic agents employed during the period when religion and superstition played a prominent part in medicine, always commands the utmost attention. Attention may be called to some of the relics of these superstitions which we have with us at the present age and generation. A number of our older drugs were perhaps named from some fanciful resemblance to some organ of the body, and it was held that the Creator had thus placed his seal upon them that they might be recognized by man, and employed in the treatment of diseased organs whose resemblance they bore.

Where it is applicable a few introductory remarks along these lines as each drug is taken up has been found to command the attention of the student and his mind becomes of a receptive type and more capable of accepting what may follow. As an example, we may take silver as our subject and start out with the part it played during the reign of Alchemy; how it was later employed in the treatment of moon sickness or lunacy. Again take the subject of arsenic. Who would not be interested in a few remarks about Madam Toffania who was a professional in the art of criminal poisoning, employing a preparation of the drug under the refined title of "Acqua Toffana"?

In order to get a line on what knowledge the student has acquired from the lecture there is nothing that takes the place of

the oral or written quiz. An oral quiz can also be made interesting by leading up to and associating the knowledge gained with some facts that are commonly known. I do not consider it demoralizing if a student should make a bad blunder in his answer. In fact, I enjoy it fully as much as his fellow students, and moreover it plays its part in keeping the student body alert during the balance of the recitation period.

The drug under discussion should be on exhibition where it is available to the student that he may learn by personal contact some of its physical properties. The appearance, color, odor and taste tend to make a mental impression which fixes the drug in the mind more vivid and lasting than can be obtained by the mere reading about it in a text-book.

During the past two years an elective laboratory course in experimental pharmacology has been offered to the dental students of our university, the results of which have been very gratifying to those teaching the course. In this course the students are divided into groups of three or four in a set. To each set is assigned some of the easier experiments which show the action of some of the important drugs. In these experiments the effect of anesthetics on respiration and blood pressure are shown, the action of such drugs as Pilocarpine and Atropine on secretions, the effect of digitalis on blood pressure and heart rate, the comparative toxicity of the phenol derivatives, the effect of local anesthetics on man, the effect of the nitrites and epinephrine on blood pressure and many other experiments of this type.

The laboratory course as I have outlined it may not be feasible in all colleges, for it requires a suitable laboratory with the proper equipment. To circumvent a lack of facilities a demonstration course may be offered which in a measure accomplishes the same result but it is not as satisfactory. The student takes a deeper interest in the work when he is made to assume the responsibility and the final results obtained are more firmly fixed in his mind when they are the output of his own hand. The time required to cover such a laboratory course will depend upon the number of experiments which are considered sufficient to give the student a general knowledge of the action of the more important drugs.

We have found that one laboratory period of three hours duration given once each week for eight weeks is sufficient time to cover such a course.

Prescription writing. The writing of a prescription is indeed an art which very few physicians or dentists have mastered. The recent graduate in medicine or dentistry usually finds this one of his greatest difficulties when he begins the practice of his profession. He may have a fair knowledge of the remedy he wishes to employ but is unable to prescribe it in a form which is best adapted to the needs of the patient. Experience has shown that a number of these men fall prey to the proprietary remedy manufacturers. At this point I wish to condemn the use of this type of preparations in the dental clinic when their formula is kept a trade secret.

Remember that the student learns part of his therapeutics from the instructor in the clinic and is very apt to employ the same remedies he sees used there.

The reason for this lack of knowledge in prescription writing lies largely with the medical and dental colleges themselves and not with the teaching. There has been a growing tendency to add new courses from time to time to an already crowded curriculum and it was necessary that some subject should make a sacrifice in time. Materia medica and therapeutics was forced to make its due share of this sacrifice during the time when there was a tendency toward therapeutic nihilism. There was a limited time in which to cover the subject so prescription writing was more or less neglected. With the elective system in force in our school this subject is taught as an elective, and judging from the number of students taking the course it is the most popular elective offered. This course will be open to the dental student the next semester, and I am already assured of a good attendance. With an added year to the dental curriculum as already provided for, there will be more time in which to teach some of the subjects which are now slighted for lack of time, and I am sure materia medica and therapeutics will come in for their due share.

E. D. BROWN, Chairman.

DISCUSSION.

Dr. Herman Prinz, Philadelphia

This most excellent report on the subject of materia medica and therapeutics gives us a fair conception of that method of teaching Dr. Kirk has tried to bring out by suggesting that we should select examples by application. Any remarks I may make should not be construed as personal. We are

here to discuss the fundamental principles underlying the teaching of subjects in dental schools, and hence when we transgress to some extent upon the rights of personality, this should not be implied as indicative of a desire to interfere with the personal liberty of each school.

In my estimation, the teaching of dental materia medica brought forward by a man not a trained dentist is a failure, for the simple reason that the application of drugs in the greatest majority of cases as employed by the dentist is so totally different from that application of drugs made by the general medical practitioner, and unless the man teaching the subject has knowledge of the dental needs he will make an absolute failure.

The disinterest shown by the student in the course is largely due to the fact that the subject is brought before him in such manner that he sees no interest in it simply because it has no application directly to the subject that will comprise his life's work. Take, for example, the simple question of the application of atropine; from a general medical standpoint we know that this drug has, among other functions. the property of inhibiting the secretory function. We know that atropine has a specific reaction as far as the eyes are concerned, and therefore its mydriatic effect is not of interest to the dental student. He is interested in only one specific function, and that is that atropine has the power of inhibiting the secretion of saliva. This is important to him, because there are times when he needs the application of atropine for that very purpose.

On the other hand, the application of arsenic is a field that has been frequently gone over, nevertheless it demonstrates very well the relationship between the teaching of dental materia medica and general materia medica. In general materia medica this agent at present is rarely employed as a caustic. There is but one specific function which this agent serves in the practice of the dentist, i. e., its application in suitable doses for the destruction of the pulp. There is never any other call for it by the dental practitioner. The dental student should know the poisonous effect of arsenic because he is very much interested in arsenical necrosis. Only recently we had three or four cases of arsenical dermatitis or necrosis over the check of patients in our clinic. This was not brought about by the application of an arsenical preparation to a tooth by our students; arsenic in fact had not come in contact with the patient through the practitioner. Upon investigation it was shown that a little arsenic was present in the talcum coating of

the rubber-dam, quite sufficient to cause this peculiar arsenical dermatitis. So, because of the possibility of unforeseen accident, the properties of this drug must be gone over very carefully with the student so he may realize that this condition may arise from the application of arsenic in any form. The internal administration of arsenic, as far as its influence on the blood, etc., is concerned, should be mentioned, and also its various preparations should be enumerated.

Relative to the teaching of the subject of materia medica, twenty years' experience has convinced me that the best way to give this course is not as a purely didactic one, but as a course always accompanied by demonstrations. We should enter into the course with a broad outlining of the subject, as Dr. Brown has rightly said, and after four or five lectures, always using introductory lectures with each group of drugs as has been stated, showing the relationship of medicine to dentistry, we should then group the various subjects under the head of materia medica absolutely according to the needs of the dentist. If we use any other grouping may it be that of Buckheim or Schmiedeberg, or any other purely pharmacological grouping which will have no application whatever to dentistry because it has from the point of view of the pharmacologist a purely biological interest only. As you know, when we consider the diseases of the mouth we find that 95 percent of all of them belong to one form or the other of infections. Therefore the great group of antiseptics with their subdivisions is of great importance. For instance, we may refer to essential oils. Generally speaking, from a medical standpoint, the essential oils have little importance outside the fact that they are stimulating agents. In diseases of the stomach, bowels, etc., they are rarely employed. But they are very important in dentistry. We should know, furthermore, that certain of the essential oils have important functions to perform in regard to anesthetic action and also as flavoring agents. We should also know the effects of the essential oils as related to the ferments of the saliva, for they are used very freely for such purposes in almost all oral hygienic preparations.

When we come to the problems connected with experimental pharmacology, we have found that it is best to separate that course from the didactic course provided you have time, and even then it will always be a matter of individuality of the teacher just how to arrange the matter. I have found it best with this particular type of work to give one hour a week during one semester. That includes the various types of weights and measures, a knowledge

of the Pharmacopoeia, of pharmacopoeial preparations, and also of the ordinary pharmaceutical methods. When, for instance, you talk of suppositories, the students should at least know how they are made and what purpose they serve. We demonstrate before his eyes a suppository machine, or show him the principles involved in the process of percolation so he will know what they are. This will impress upon his mind the process involved and when he talks about a fluid extract he will know how it is made. He will never forget these things.

We have then in the third year also, as Dr. Brown has in his school, a course of laboratory work, experimental pharmacology, which covers 80 hours, twenty hours for 4 weeks. And here we give our students experimental work in groups relative to those dental principles the dentist is going to apply in his office. He will have knowledge of the action of the various types of local anesthetics, why they act as poisons, the relationship of the toxicity of the various local anesthetics, the inhibitory effect on nerve function. We have then also incidentally given a knowledge in regard to handling the measuring apparatus, scale, weights, etc. If you give to an average graduate a measuring cylinder and ask him to outline the meniscus in his measuring cylinder, he looks into the cylinder to see where the meniscus is found. Teach the student the relationship of comparative measures: Here is a glass of water and here a tablespoon, now give me a tablespoonful of water; then measure it in cubic centimeters and then let him measure it out in apothecary's measure, and he will know approximately what you mean by saying, a tablespoonful. If you ask him to weigh or measure it out, you will be surprised at the results obtained, simply because it is of such ordinary every-day occurrence he has not paid any attention to it.

Outlining the course in this way, always referring to the dental side of the subject, always using the broad basis of pharmacological division of group action,—that is the foundation which will make the course so interesting that our students will come and want more instruction than we can afford to give them.

Dr. Alfred Owre, Minneapolis

There is a thought in connection with the last gentleman's discussion which interested me very much, and that is this: Dr. Prinz advocates the teaching of materia medica from the standpoint of the dental field altogether; at least he implies much in stating that when taught by a man not a trained

dentist materia medica is a failure; that we should have illustrations from the dental field almost entirely.

There is one tendency filled with danger to any profession—the tendency to narrowness. I suppose we must apply that to ourselves first in a very large degree. It is possible to have a dentist sufficiently educated in the fundamental principles underlying both professions to present this subject, and it is equally possible to have a physician so well educated that he can present it in the same efficient manner. If either man cannot present the subject with enough of the distinctly dental illustrations to make it interesting, let us get a better teacher, regardless of his degree. The dean of one of the leading medical colleges in this country is not a physician at all; he is a physiologist.

Another point: The usual instruction in ethics given in technical schools is limited to a few rules—"Do this," "Don't do that." When the student finds himself in one of the dilemmas which inevitably involve him after leaving college, he has not been trained to adjust himself to the new situation. And so it may be all through the dental curriculum. Unless a man is well trained in principles, no matter who has taught him, when it comes to new situations he is unable to adjust himself. The "do's" and "dont's" are the stunts in education; they are not sufficient for the future.

Dr. A. E. Webster, Toronto

In those departments where two men's time is required, should not one of them be the scientist and the other the dentist, it being just an accident as to which should be the head of the department? We all agree that in every department there should be somebody in preparation for the head of the department. Then if it should occur that the dentist is the chief of the anatomical department, his associate will be an anatomist, and then if the dentist should retire the anatomist becomes the head of the department and his associate would be a dentist. In that way you have the scientist getting a little bit of help from the dentist, and the dentist having the scientist to give a little scientific flavor to his "stunts."

Dr. E. H. Long, Buffalo

I want to commend the report presented by Dr. Brown as advocating a good broad basis for the study and teaching of this subject. An experience of something over twenty years in teaching dental students has given me some posi-

tive convictions, and I was gratified to hear this report set the subject forth as it did.

It has always seemed to me that the chair of materia medica and therapeutics forms the natural link between medicine and dentistry, provided the man who occupies it has an appreciation of the dental side and also possesses a medical education. And at the present time particularly does it appear, when the field of dentistry is broadening out and touching so vitally some of the most difficult medical problems, that the dental student should be given a much broader training not only in pathology, but also in therapeutics. I need only refer to the action of certain drugs upon the heart and circulation, as stimulants and depressants; such anodynes as morphine, which every dental graduate ought to know thoroughly; the field of anesthetics and the field of toxicology as related to the drugs that the dentist will use. These indicate a large field that may serve to give the dentist a broad training in therapeutics.

Then, of course, the local remedies that he is to use will be taught very thoroughly, both as to their action, and, in general, as to their application.

It has always seemed to me a mistake for the chair of materia medica and therapeutics to attempt to teach all details of treatment. Something ought to be left to the chair of operative dentistry as to the details of the application of drugs.

Let me say that the men in New York State recently met with some difficulty in our State Board examinations, which illustrates the necessity of broadening out in some respects. Evidently we have had an examiner who thought it necessary to broaden out a great deal with reference to the state board questions. The result was that we had one examination in which more than half the questions were along medical lines, and naturally the men nearly all failed. We could not expect them to be prepared to meet a medical examination in general materia medica and therapeutics. That shows what the tendency may be in some quarters.

I have come to believe also that at least a pretty good percentage of value of the course in materia medica and therapeutics lies in emphatically schooling the students against the use of proprietaries. If that is a very great evil in medicine, I believe it is a still greater evil in dentistry. One reason is that the average dental graduate is less fortified against the wiles of the retail man.

So I like to impress upon our senior students that every one of them may be just as well qualified to get up an antiseptic mouth wash or a tooth paste, as any one who brings these things to him ready-made, and perhaps better qualified.

It is only necessary to study the results of testing some of the most popular proprietary preparations to know that their value is slight. I think we ought to plant the feet of our students very firmly upon the United States Pharmacopoeia and teach them so that they will be able to make up their own preparations.

As to prescription-writing, any one who has had much experience knows that you cannot turn out students with any sort of efficiency by the didactic teaching of prescription-writing. It is impossible. So it has been my practice to have the students write actual prescriptions and have them criticized by two members of the class and returned to me for final criticism.

Just a word in regard to the exhibition of drugs. I was glad that subject was touched upon in the report. Through considerable unpleasant experience I have learned that it does not amount to very much to pass drugs around in a class. It disturbs and interferes with attention to the subject under discussion. But we have done which has been suggested or implied in the report: We have a materia medica cabinet that contains all the important drugs that are to be used; this is left unlocked, and the students are invited to go there at any time and study those drugs—taste them, smell of them, and study them as far as they may without carrying them away. And this works very well.

Dr. E. C. Kirk, Philadelphia

I have absorbed the impression from Dr. Owre's remarks supplemented by those of Dr. Webster, that there are under consideration here two classifications of teachers: One is the scientist who teaches pure science, and the other is the dentist who "does stunts."

Some years ago I happened to overhear the conversation of two young women upon a subject which I believe is frequently discussed among women, and that is the topic of marriage. And the point of issue was whether it was preferable to marry an old man with money and for money, or to marry a young man for love. The discussion waxed very hot and after a while one of them said, "Which would you rather be, 'an old man's darling or a young man's slave'?" Whereat the other said, "I don't consider that that is exactly the issue; those are not the only alternatives, I should

prefer to be a young man's darling with the prospect that he would become rich."

So in discussions of this sort the tendency is to limit it to two alternatives. I want to suggest that there is another alternative. and that is the thing I have been trying to emphasize—a scientifically educated dentist. There is such a thing as that, and that is what we are hoping to achieve. And why not have a scientifically educated dental teacher? I don't think any of us will disagree in the matter, take, for example, the question of anatomy, isn't it important that the dentist should have a good general knowledge of anatomy, and isn't it equally important that he should have a very full and definite working knowledge of special anatomy? That is to say, there is a section of the human body of which he must have an absolute and complete knowledge. But is it necessary for him to have the same kind of knowledge of anatomy of the whole body?

It is the same with materia medica and therapeutics. The students should have a general knowledge of materia medica and therapeutics, and he should have a scientific knowledge of it, but he should have a highly developed special knowledge of that section of materia medica and therapeutics with which it is his province to deal.

Now, if that is the situation, I would like to know whether it is an impossibility to have that subject taught by men dentally educated who can scientifically present that subject? I do not believe it is. Why in this body of educators we should make a distinction between the man who teaches technical dentistry as a man who "does stunts," and the scientist who teaches the principles with the "broad swing" I cannot understand. Why can't these qualifications be combined in one man? I am pleading for the recognition of the man with a broad, scientific education who is at the same time especially educated in his chosen subject. Isn't that the need in all education?

Dr. F. B. Noyes, Chicago

The remarks of one or two of the last speakers have brought up certain points which are important. For instance, one speaker says, Why can we not have trained dentists who are scientists to treat these subjects? We can; I hope, in time. But as I have looked at it, one of the worst things about dentistry and dental teaching has been its tendency to wretched superficiality. You cannot take a dentist and send him to Kokomo for three weeks and make a scientific anatomist out of him to teach

anatomy to dental students. And in more than fifteen years of teaching I have been absolutely convinced that from the standpoint of the dental student, a better assistant, a better teacher, of dental histology can be made out of a well trained histologist than can be made out of a well trained dentist that does not know a thing about histology, and does not want to, perhaps. But even if he wants to, I don't care how badly he wants to, he may be a splendid dentist, but if he wants to teach dental histology he will have to do more than spend three weeks or a few days in the histological laboratory to equip him to teach the subject.

To make the point clearer: Given a well trained histologist who is familiar with and has clearly worked out the requirements of dental histology, he can present the essential points to the dental student in such manner that he will grasp clearly the principles of histologic structure related to cavity preparation, he can teach it efficiently, exactly, definitely. On the other hand, the dentist who knows only the requirements of cavity preparation, cannot acquire the miscroscopic interpretation, the knowledge of histology, that will keep him from being absolutely floored by students, which ruins his effect as a teacher. More than that, ten to one he will on his own account branch out into fields he knows nothing of and get into very serious trouble.

The point, then, in my mind, is that we must train from the most advantageous source special teachers for dental students. And that source at the present time is not the dental practitioner or the recent graduate, but the well trained scientist.

Dr. Brown,
(Closing the discussion)

It has certainly been very interesting to me to listen to all this discussion as to how the subjects of materia medica and therapeutics should be taught. I gather from the discussion that they should be taught either by a person who has devoted his life to the teaching of these particular subjects, or by one who is specializing in a certain line.

As you all realize, this is the day of specialization. Many practitioners in the medical profession are working along special lines, and this is also true in the dental profession. One practitioner may devote most of his time to the extraction of teeth and he becomes more proficient in that particular line, so other dentists refer their patients to him when there is extraction to be done. And there are other specialties in the profession of dentistry. In the

medical profession many men devote much of their time to specializing along certain lines; still, these men do not like to be called specialists. The only "specialists" we have, as a rule have their pictures in the paper and an advertisement telling what they do, or else they own a medical institute or something of that kind. Therefore, the ethical members of the profession do not like to be called specialists, but they do admit that they specialize along certain lines.

Now the question before us seems to be whether the subject of materia medica and therapeutics should be taught by a person who is specializing along this line, or whether it should be taught by a dentist.

I have always taken a broad view of this question, and I look at it this way: The physician knowing the action of drugs does not have to send his patient to a dentist if he should have an ulcer of the mouth or some little infection; or, for example, if he has to stop hemorrhage after a tooth has been extracted. The condition requires the same application of his knowledge there as would be the case in any part of the body. On the other hand, if he meets a patient who has to have teeth repaired he refers him to a dentist.

Referring to Dr. Prinz' remarks I cannot agree with him. He says that the subject should be taught from the standpoint of this special part of the body, that is, from the purely dental standpoint, and he takes as an example the drug atropine. If we teach a student that atropine inhibits secretions, should we tell him only that he can use this agent in dentistry because it paralyzes the secretory nerve endings in the submaxillary salivary gland and stops the secretion in this particular gland? Would it not be wise to tell him that it likewise produces a paralysis of the motor nerve endings in the iris and celiary muscles causing pupullary dilatation and loss of accommodation? Supposing he uses an excessive amount of this drug, he ought to have some knowledge of its action other than that of inhibition of salivary secretion, so that he could be governed in its use by knowing the full physiological effect of the drug. Suppose his patient complains of a dry throat after he has taken the drug, should not the dentist know that the atropine does this, and be able to tell his patient that this result is merely an effect of the drug that will wear off?

This phase of the subject appealed forcibly to me on one occasion just after I had started in practice. A woman living in

my neighborhood was very nervous and had a badly acting heart. I was called to see her one day and observed that her heart was going at a very rapid rate. A hypodermic injection of digitalin was given in the arm. The next morning she came to me with the arm swollen to about twice its natural size and red all over; she said it pained her and kept her awake all night. The first thought that came to me was, "Have I infected this woman with erysipelas?" But I just thought of the action of the drug. Digitalin, as we know, is an active glucosid and toxic, and occasionally one has an indiosyncrasy towards it. I examined the case carefully and satisfied myself that the trouble was due to the drug. So in addition to easing my own mind I was able to ease that of the patient by telling her that it would all subside and that she need not fear the outcome. As I had predicted, it came out all right.

In the case of arsenic, Dr. Owre and Dr. Prinz have both spoken of this agent. I have often found that if I ask the dental student how to treat an arsenical necrosis of any part of the body other than the mouth, he seems to be at a loss to know how to do it. He seems to think only of necrosis of the jaw. You have got to know the action of some of these drugs; not their application alone, but their physiological action. You may not use arsenic, but perhaps your neighbor down a block uses it: he may have used this agent on a patient; that patient does not go back to him because he has necrosis of the jaw and comes to you to take care of it. Under those circumstances you have to recognize the condition and know what to do for it; it is *you* who will have to make the diagnosis. So we see the importance of knowing the action of the drug, not only its application, but its physiological action and the treatment. Should you get a case of poisoning you ought to know the symptoms and you ought to know the treatment.

I could illustrate many of our drugs in this way: Take cocaine, or its substitutes, as an example. Supposing you have a patient collapse in your office after the administration of one of these local anesthetics, what are you going to do—go out and hunt up a physician or do something yourself? You should know the action of these drugs and know what to do in order to meet the conditions.

Various points have been brought out in relation to the teaching of subjects other than materia medica and therapeutics, so I shall not discuss those subjects.

Dr. Long spoke along the line of the proprietary preparations. In medicine, as you probably all know, they are making a

great effort to do away with this evil. We know that a great many remedies of a proprietary nature are used in dentistry. It is undoubtedly true that dentists prescribe many of these for patients. There is no reason why the dentist should not write a suitable prescription himself instead of recommending a proprietary preparation. In the dental clinic we expect the student to acquire the ability to make application of these therapeutic agents, as the teachers of materia medica and therapeutics do not give the application; that depends on the instructor in the clinic, and there is where the student gains this part of his knowledge. We expect the medical student to acquire the ability to make clinical application of these remedies when he gets into the hospital or infirmary. We cannot be expected to show the clinical application because that is impossible. We can only teach them the fundamental principles, and when they come into the clinic then the application of these principles is shown.

REPORT OF COMMISSION ON TEXT-BOOKS.

While there has not been, owing to some unknown delay in transmission, as large an exhibit of books as formerly, the interest in those displayed on the exhibit table has been continuous throughout the session of the Institute. Thirty-five books were sent from Blakiston's Son & Co., which have not arrived. Seven other publishers sent fifty-seven books as follows:

W. B. Saunders Co.	19
C. V. Mosby Co.	12
Wm. Wood & Co.	10
F. A. Davis Co.	9
J. B. Lippincott Co.	4
Lee S. Smith's Son & Co.	2
Consolidated Dental Mfg. Co.	1

Among these, the new books or editions of former issues published since our last report are as follows:

W. B. Saunders Co. 13.

Essentials of Histology	Le Roy
Essentials of Physiology	Budgett
Pathology and Bacteriology	McConnell
Dictionary, large and small	Dorland
General Bacteriology	Jordan

Materia Medica, Pharmacology and Therapeutics..Bastedo
A Text-Book of Pathology.....Stengell & Fox
Alveolar Dental Pyorrhea.....Bass & John
Local Anesthesia.....Allan
Medical Chemistry and Toxicology.....Holland
Text-Book Physiology.....Howell
Dissection Methods and Guides.....Metheny

C. V. Mosby Co. 6.

Practical Orthodontia.....Dewey
Comparative Dental Anatomy.....Dewey-Thompson
Dental Physiology.....Pearce-Macleod
Surgery and Diseases of the Face and Jaws.....Blair
Cavity Preparation.....Severns
Dental Jurisprudence.....Brothers

F. A. Davis Company. 4.

Essentials of Laboratory Diagnosis.....Faught
Operative Surgery.....McGrath
Diseases of Eye, Nose and Throat.....Phillips
Old Age Deferred.....Lorand

Wm. Wood & Co. 3.

Text-Book of Anatomy.....Cunningham
Physiological Chemistry.....Mathews
Dental Metallurgy.....Hepburn

Added to this list is the work of the late Prof. G. V. Black "Special Dental Pathology," published by The Medico-Dental Publishing Company, of Chicago. Also, seven books reported by P. Blakisten's Son & Co. in the assignment which failed to reach the meeting:

Oral Surgery.....Brophy
Physiology .....Halliburton
Emergency Surgery.....Sluss
Operative Dentistry.....Johnson
The Adolescent Period.....Starr
Compend of Anatomy.....Potter
Anatomy and Physiology.....Bundy

The commission plans, if it meets your approval, to send to the dean of each college a list of these new books with the request that he inform the members of his faculty of the issuance of the books affecting the department in which each may be interested.

ELLISON HILLYER, Chairman.

DISCUSSION.

Dr. W. E. Willmott, Toronto

When this commission was first formed, there was an intention to consult with the publishers and the authors and endeavor to get somewhat of a standard size and form in the matter of text-books. I would like to ask if anything has been done along that line.

Dr. Hillyer: That was taken up in detail with the publishers and responded to by several very favorably. I said to one writer, who was working upon a very valuable book, "In the preparation of this work are you planning it as a text-book for students? Our commission has been very anxious to, as far as possible, make these books conform to certain uniform specifications or requirements." He replied, "I don't care anything about the commission; I am going to write the book as I please." What can you say to a man like that? He is going to write as he pleases, issue it as he pleases, and take the results. There is no way whereby we can force our desires upon writers. The only way that we have any recourse will be in the manner in which it is received here and I do not know that some of them would care much about even that. The matter was taken up, in the beginning, by Dr. Friesell, and we had much assistance from Mr. White of Blakiston's who came to our meeting, conferred with the commission, and has been working in harmony ever since. Several publishers would be glad to do this and in many cases have done so in a measure. But many men who are writing books have no knowledge of the existence of the Institute, much less the commission. Undoubtedly, it is true that many members of the profession do not know that the American Institute of Dental Teachers exists, let alone what we are trying to do and what their co-operation might mean to us and to the profession.

Dr. Willmott: Would it be possible for the commission, in making its report, to indicate after the name of the text-book, those authors that have lived up fairly well to the ideals of the commission?

Dr. Hillyer: It would be perfectly feasible to incorporate that point in our report and I shall be very glad indeed to again make that as a part of a letter addressed to the publishers, possibly making it a personal matter.

Dr. D. M. Cattell, Memphis

Was it not the intention when this commission was organized that it should act in a sense as a censor to recommend a book or not? I thought that was the idea of the commission when created. Lists of all new books are sent to us, we know what is being published just as well before this report is read as we do afterwards. But what we want, at least what I want to know is what this commission advises as to whether a certain book is a good one for students, whether it is a good text-book or good only as a reference book, or simply a good book to have in the library at home.

To me there exists a great difference between a book written for, or as a *text*, for instructor and student to follow and one that is merely good reading on the subject. To decide that was the commission arranged, as I understand it, and when a book is "recommended" as a fit text for schools to use in following out their prescribed curriculum or relegated to the mere "reference" list it should not again be adjudicated upon by the commission. A list of all books as passed on should be published each year in the Proceedings.

Dr. J. D. Patterson, Kansas City

That is what I want. I do not understand the value of the commission, Dr. Hillyer, otherwise. There are books mentioned in this report the authors of which ought to be put in jail for writing. What is the purpose of the commission and of what practical and scientific use is it to our Institute, if there is not a recommendation or a censorship? And the report should be discussed upon those points. Of what other value is it to us?

Dr. A. E. Webster, Toronto

As a member of the commission I will say that we occasionally have the galley-proofs or page-proofs given to us to read. Last year we had three such presentments. In our recommendations you will see that one of those books we found was not desirable to be published as a text-book for dental students so it was not reported. We have not said a word about it this year, for we gave our criticism last year. It was published. In another case we saw the galley-proofs ready to go to press, they did not go to press which I think was a wise thing on the part of the publisher and author as well. We have suppressed many books in that way, but after a book has come before the profession it is difficult to step out to publisher or author and

say that we believe the book is no good. I quite agree with Dr. Patterson, some of the authors ought to be shot, at the same time we don't want to do the shooting.

When we say nothing about a book, good, bad, or indifferent, some of you might take a hint that the report does not inform you why that is. There has been nothing published in the way of new books during the past year that we would recommend as text-books for students in dental college.

Dr. Hillyer: May I add something to what Dr. Webster has said? If this work were to be carried out to its best fruition, I believe that we should have much more scope and also that the commission should be much larger. In other words, it seems to me that if the work were to be carried out to the best advantage we should have men upon the commission, representing each of the teaching subjects, who would be capable of taking every one of these books and literally reviewing them. What is the situation today? The books come here and we open them on the morning of the first session and we spend all available extra hours, and there are not very many of them, during the time of the meeting, and, as far as we possibly can, we endeavor to see what has been sent, and, as is usual in committee work, we have practically had to lose the benefit of several sessions to culminate the work so that we can report to you. That would in a way answer Dr. Patterson. I do not believe he wishes to criticise the commission—I hope not because I would feel badly if he did. But I do not believe we should render a "snap judgment" on a book because if reported under these conditions it would be unfair. I believe that would practically be a "snap judgment." If this work is to be carried on the size of the commission should be increased to eight or nine at least, the members to come here ready to report on all books reviewed. Each member of the commission should be on the look-out for books belonging to his branch and be prepared to make a report that would be of inestimable value.

There is another matter which it might not be unwise to refer to at this moment for it has been instrumental in suggesting this idea. While at the University yesterday we had something of import pertaining to prosthetic dentistry that we wanted to present to those members especially interested and we met and spent considerable time going over a subject with a great deal of benefit to ourselves. We felt that if at future meetings of the Institute we could have a session devoted to sectional consideration of our

work, we would accomplish much that would be valuable. If we had sections covering every branch, it would be necessary, of course, to have merely an organization of a section so there would be a chairman and secretary in order that the business might be carried on uniformly, and so that somebody might be responsible for the selection of a meeting-place and for a record of the work.

If we had sections of that sort, it might be that the *chairmen of these sections could be the ones to form the commission on text-books and be ready to report.* I offer this merely as a suggestion.

Dr. Patterson; I had no intention of criticising the work of the commission. I am very glad indeed to learn from Dr. Webster's remarks of the good work they have done when advance or proof-sheets have been submitted to them and they have made needed suggestions. Along those lines the commission certainly has had a good function and has performed it. I did not know that this had been done. I desired only to refer to the fact that it did seem to me that if books did not receive the sanction of the commission they did not need to be mentioned, but simply not be included in the list of books presented here as having come out during the preceding year.

Dr. Willmott: At the St. Louis meeting, in my president's address I made the proposition as to the advisability of having sectional meetings, and was most severely sat upon. I see now that I was about six years ahead of my time, and am glad that the rest of you are coming to it.

I move that the Executive Board be authorized to arrange for a meeting of sections during one session of the next meeting, and that the chairman of the sections be added to the existing commission on text-books. (See minutes).

REPORT OF THE MASTER OF EXHIBITS.

Of the fifty colleges in this Institute who were requested to send a technic exhibit to this meeting, twenty-two responded, and of that number the following twelve presented an exhibit:

Northwestern University Dental School.
Vanderbilt University, Department of Dentistry.
University of Iowa, College of Dentistry.
Ohio State University, College of Dentistry.
University of Pittsburgh, School of Dentistry.

New York College of Dentistry.
Colorado College of Dental Surgery.
Laval University, Dental Department.
Creighton University, College of Dentistry.
Georgetown University, Dental Department.
University of Minnesota, College of Dentistry.
(Exhibits shown at the College Building)

Also an exhibit from the Post-Graduate School of Orthodontia, of the Forsyth Dental Imfirmary.

Grouping the different types of work that were exhibited we find:

9 Operative Technic exhibits.
8 Dental Anatomy exhibits.
Prosthetic Technic exhibit.
5 (a) Plate Technic exhibits
6 (b) Crown and Bridge Technic exhibits.
5 Drawing (free hand and Mechanical) exhibits.
3 Orthodontia Technic exhibits.
4 Instrument Technic exhibits.
4 Card Systems exhibits.

(These exhibits varied from one to twenty pieces)

It is of interest to note the number of Exhibits in Operative Technic and Dental Anatomy, showing where the interest of the exhibitors were centered.

It was my plan and I believe it should be done in the future, to group the exhibits according to the character of the work. The large groups in separate rooms. This I believe would make an ideal exhibit, but of course this plan was absolutely impossible with the number sent to this meeting.

I wish to thank the schools who took the time and trouble to send exhibits to this meeting,

Respectfully submitted,

HARRY C. LAWTON, Chairman.

REPORT OF THE COMMITTEE ON GENERAL PATHOLOGY, DENTAL PATHOLOGY AND BACTERIOLOGY.

Just at the present time it might be interesting for the teachers here to think of the position of pathology as taught in the dental school as compared with pathology as taught in the medical school. At the present time, if you speak of pathology in a general medical

school, you think of it as more or less of a science having little to do with practice, a separate and distinct chair, as being the foundation for practice. In a dental school when we say pathology, dental pathology, we seem to have no definite separation of the subject of pathology from the practice of dentistry or from therapeutics or from I may say the broad subject of dentistry. They are mixed up in all kinds of ways. In some states the whole course of pathology in the dental school is given by a dentist from the practice chair. Then in another school there may be laboratory courses attached which are supposed to be pathology.

It might at this time be worth considering whether it would not be wise to make a classification of what dental pathology is, and what pathology, as applied to a dental school, is.

In the course outlined here, I have followed somewhat the course as given in our own school, yet there are marked modifications. Our judgment is that the course should begin in the second year, having in all about 15 lectures and 75 laboratory hours. Now, these 15 lectures shall be made up first of five lectures as a general introduction to the study of dental caries, and such subjects as zoology, biology, embryology and bacteriology discussed in a general sort of way in five lectures. You will keep in mind that I am referring to dental pathology as understood by dentists, not strict pathology as understood by a medical school.

The course outlined is one suitable for four years. This has been developed in our own school during the past twelve years in carrying out a four-year course. It is not as it was two years ago or five years ago. Conditions have changed in practice and we have tried to develop along with the changing conditions.

Suggestive Outline Of Course In Dental Pathology For Four-Year Course In Dental Colleges.

SECOND YEAR.

15 lectures and 75 hours laboratory. —made up of zoology and botany.

5 Lectures as general introduction to the study of dental caries and diseased conditions, embryology, bacteriology and pathology.

3 lectures in conjunction with operative technique, a study of the beginning and progress of dental caries from extracted

teeth. Theories of dental caries and means of prevention, therapeutic and mechanical.

7 lectures. Inflammation—in general; pain, pulpitis, gingivitis, pericementitis, gangerene, necrosis, cellulitis and alveolar abscess.

These should be studied as a part of operative technique and therapeutics in the presence of many specimens, illustrations and lantern slides.

THIRD YEAR.

AUTUMN TERM.

10 lectures and 75 hours laboratory. As a part of the operative technique course.

A further study of dental caries with special reference to causes and prevention. Causes of pain.

A study of inflammation, pulpitis, pulp infection, abscess of the pulp, gangerene of the pulp, pericementitis, alveolar abscess, cellulitis, necrosis and gingivitis.

AFTER CHRISTMAS.

5 lectures and 70 hours Bacteriology laboratory. (7 consecutive weeks, 10 hours a week).

A study of the principles of bacteriology, the principle bacterial forms, their modes of reproduction, the diseases caused by them, susceptibility and immunity. The subject of primary pathology should be briefly presented.

In the laboratory course the equipment should include culture ovens, sterilizers and conveniences for making culture media. The practical instruction should include the preparation of culture media, planting and management of cultures, separation of mixed cultures; cultures from carious teeth, and putrescent pulps from practical cases in the Infirmary. Special attention should be given to the study of the bacteria of the oral cavity.

FOURTH YEAR.

50 lectures; 30 hours laboratory (classes of 20); 20 hours clinics (classes of 20); 10 hours diagnosis and quiz at the chair.

Laboratory. Special pathology of tumors, diseases of the pulp, pericemental membrane, gum tissue, secondary dentine, dental caries, cysts, bone repair, exostosis, excementosis, ankylosis, absorption of bone, absorption of tooth tissue, hypertrophic and atrophic tissue in bone, tooth tissue and soft tissue.

Clinics. In small classes for the purpose of illustrating every pathological condition that may be found in an ordinary dental infirmary. The students should have an opportunity to examine each case besides being quizzed and directed to the library to study the cases presented. Special attention should be pointed to the relation such pathological conditions have to the general health of the patient. The students with the assistance of the pathological laboratory should obtain, prepare, examine and report on all pathological specimens from the clinic.

Diagnosis and Quiz. Each student should be required to make a complete examination of at least five patients and write out a complete history of the pathological findings and be carefully quizzed upon his findings.

Besides this, of course, is the regular pathological clinic of the infirmary where the student sees from day to day what comes under his care.

Lectures. Development, calcification and eruption of the teeth.

Signs, symptoms and diseases of eruption: causes of eruption, abnormalities of temporary teeth, absorption of the temporary teeth, diathesis effecting eruption, irregularities of form of teeth, atrophy of the teeth.

Affections of hard parts of the teeth: erosions, attrition, abrasions, concussion, dislocation, fracture. Diseases of the pulp: hyperemia, pulpitis, degenerations, secondary or adventitous dentine, calcification, pain about mouth or local diagnosis of pain teeth. Diseases of the alveolar dental periosteum: pericementitis or periodontitis, acute dento-alveolar abscess, chronic suppurative periodontitis, sequelae of local chronic periodontitis, necrosis of cementum, ankylosis (Synostosis), general periodontitis. Affections which may arise from dental neglect: of the muscular system, of the gastro-intestinal tract. Diseases of the gums, mucous membrane of the mouth, gingivitis, lead poisoning affecting gums (lead line), stomatitis, mercurial, gangrenous, noma or cancrum oris, aphthous,

epulis, papillomata (analagous to warts), naevi, scurvy, purpura, penphigus.

A. E. WEBSTER, Chairman.

DISCUSSION.

Dr. A. D. Black, Chicago

I was a member of the committee which was to present this report, but unfortunately, on account of a trip west, I was not able to co-operate with Dr. Webster, and therefore did not do my duty in connection with this presentation.

There are certain propositions by which we should be guided in presenting our courses in dental pathology. It seems to me that we should have a definite co-ordination of the subjects of general anatomy, physiology, and general histology, with general pathology, and, later, of dental histology and dental pathology. I will make two or three suggestions along this line.

We would naturally expect to give our courses in general anatomy, physiology, and general histology previous to taking up the subject of general pathology. General pathology should precede dental pathology. The courses in anatomy, physiology and general histology may be arranged to parallel each other to a greater or lesser degree. For example, the digestive tract may be placed in the same position in the courses in physiology and histology, so that the same tissues may be studied as to their functions and structure at the same time. The respiratory and other groups may be similarly studied. The courses in general histology and general pathology may be arranged to supplement each other; for example, in the laboratory course in general histology, the student is required to make drawings of the normal tissue, say of the liver. Along with that study there may be presented two or three slides showing pathological conditions of the liver. Not that the student is to draw those, not that they are to be emphasized at that time, but just to impress him, while studying the histology, with the radical changes which may occur under diseased conditions. This demonstrates the importance of knowing the normal tissue. Then the next year, when the student will be making a serious study of the pathological conditions of the liver, he may be shown a section of the normal, to refresh his memory and emphasize the changes which have occurred. We think this results in more effective teaching.

The same thing may be done in the teaching of dental histology and dental pathology. The laboratory course in dental pathology would follow the course in dental histology. When the normal pulp tissue is being studied in the histological laboratory, a slide showing an inflamed pulp may be shown, and while studying the normal dentin, a slide showing carious dentin may be introduced; thus the study of histology has just a little interesting touch of pathology. Drawings are made of histological slides, and only a few minutes are devoted to the pathological specimens, with a little talk by the instructor. The next year in the laboratory course in dental pathology the student may be reminded of the histology of those tissues in a similar way.

I must confess that in the presentation of the headings by Dr. Webster I do not get quite clearly in mind some of the items referred to although I tried to set them down in order. As nearly as I could get it, he would represent a combined course of a little of general pathology, and of general bacteriology, with more or less of dental pathology.

I am very much of the opinion that the teaching that we do in general pathology and bacteriology ought to be very definite, separate courses. This brings up a thought in connection with the teaching of all those courses which might be termed basic or medical courses. We should recognize the fact that it is impossible for the dental school, even in a four-year course, to teach everything taught in the medical school as preparatory to the dental course. I think we will do better, after conference with medical teachers in these branches, to pick out certain parts of the course in each subject, and teach these parts thoroughly, rather than to endeavor to get the whole of each course into the limited time at our disposal, which means that most of it is skimmed over. This applies to anatomy, physiology, bacteriology, general histology and general pathology. Would it not be better, in teaching anatomy, for example, to have our students dissect thoroughly the head, neck and arms, rather than to hurry through with the dissection of the entire body?

I cannot see how it is possible to separate the teaching of pathology from therapeutics and from practice, unless we have very close co-ordination between the men who are presenting these different subjects, because we need in the presentation of pathology the interest which will be brought into that study by the ability of the teacher to impress the need of a thorough knowledge of the pathology in practice. This might not be so if we were teaching in

a school where all of the men were good students, thoroughly absorbed in their work. But unfortunately the dental student is not always of that type. We have men coming to us who are prejudiced against many of the things that we know are very important. There is no better example of this than dental histology. I would question very much the ability of the most expert teacher of general histology to sufficiently interest the dental student of today in dental histology, because of his inability to impress on that dentist the need of dental histology in practice. We need the support of all of the operative and prosthetic teachers in the teaching of dental histology in order to thoroughly impress upon the student the need of it in practice. And so also do we today experience this necessity in dental pathology, because we are coming to the place now I think, more than we ever have before, where the teaching of the histo-pathology, especially in the investing tissues of the teeth, is of the highest importance, as a basic for proper treatment of those lesions which are of such vital importance in the consideration of systemic conditions resulting from local infections.

Therefore, while we should have in each school a definite chair for the teaching of dental pathology, there ought to be the closest possible co-ordination between that chair and all of the others that bear on the subject, and they should be so close together that every other chair will bring their support to that study. It would certainly be very unfortunate to have one man teaching dental pathology, one man teaching practice as applied to that pathology, and another man teaching therapeutics, and all three teachings along entirely different lines and contradicting each other all through the course. We had better have one man teach all three than that.

In the last analysis no one of us can say which is the best way to teach in any school but his own, because it will depend on the men available to teach. I would rather have one scientifically trained dentist to teach all three than to have two dentists and one medical man, or any other combination, unless each of those three men understood what the others were doing and all worked in perfect harmony.

Dr. J. D. Patterson, Kansas City

I would like to say one word about a phase of the subject that interests me very much. I have been trying to teach pathology for over thirty years and I am quite sure that I have failed, and from my experience it seems to me that there is one specific reason why I have failed. And that is because the

students who come to us have no knowledge of biology, the science of life. Pathology is only a subdivision of biology, and so it is with many of the other subjects in the dental curriculum. And how one is to teach dental pathology to one who knows nothing of the science of life, I cannot understand. And I think the curriculum should embrace as thorough a study of living human or animal organisms as possible before the student can be taught very much about dental pathology.

Our students come to us from high schools, fortunately a small per cent come with some education in addition to that received in high school, but the fact of the matter is that they do not come to us with that knowledge of the animal organism—how it is built, how it gets its nutrition, the functions of the different organs of the body that constitute the science of life; and then how in God's name are they going to understand when it comes to a departure from the normal, the abnormal? I do believe, as the last speaker has said, that the man who teaches pathology should also teach the necessary biology, then general pathology, then the dental pathology.

A high authority in the scientific world who has been teaching in professional schools all his adult life, has this to say of the preparatory training which the applicant usually has for entrance to the professional school: "They come to us not knowing the simplest functions of their own bodies; the simplest functions of their own bodies remain to them a sealed letter; the commonest laws of nature are to them inscrutable; the ignorance of natural law is almost abyssmal. They may be able in Latin or philosophy to do something, but are unable to tell the difference between granite and limestone; know nothing of natural science of which biology and the teaching of pathology is one. Of rhetoric they may talk learnedly, but are unable to locate the liver in their own body or tell its functions; they are unable to tell whether the pancreas is located above or below the diaphram, or indeed whether there is a pancreas or not."

The above quotation may be taken as simply indicative, yet the inference is, I think, undeniable that the average student, the high school graduate, who appears in a dental college knows little of natural science, little of biology, and often cannot speak or spell the English language correctly.

Here then is the situation (for the majority of colleges at least). The "graduation from high school, or its equivalent," will not probably be changed or increased for many years, so we must

do the best we can with the high school material. In the additional time allotted by the four-year course my individual desire is to make abler pathologists. Then will the student be able to reason from cause to effect when pathologic conditions arise. Etiology will be no longer obscure, methods of infection he can then trace, immunities he can work out, heredity he must be acquainted with; be at home when prevailing interest in systemic disturbances from mouth conditions is being discussed, and I might add that he can then block unwarranted assertions which are now so often made by members of the medical profession.

Opinions as to the best methods to pursue in the added year will vary. The foregoing observations are suggestive and personal and do not embody the view of a majority of the Faculty in the College I represent. Their desire and purpose is to spend the added year in post-graduate and apprenticeship work. That method must have a strong appeal to all teachers who have witnessed a lack of confidence when the graduate is starting in practice.

Dr. Webster
(Closing the discussion)

I have nothing to add except to commend what Dr. Black has said in reference to presenting enough pathology during the teaching of histology to create an interest in the subject—good, sound principles of teaching. But just why Dr. Black would suggest a definite course in general pathology, as I believe he intended to present, wholly separate and distinct from the course in dental pathology, I do not know, and that it should, as he suggests, be almost circumscribed. I cannot see why the illustrations of general pathology may not be taken from the tissues of the mouth and surrounding parts in which the dentist is interested, as well as from some other part of the body. Why it is necessary to illustrate inflammatory processes by specimens taken from, we will say, the liver, when he might just as well take them from the tongue, I do not know. One of our criticisms of a book on pathology for dental students, made last year by the commission on textbooks, was that nearly all of the illustrations of pathological conditions were taken from some other part of the body rather than from the mouth or surrounding parts when they might all be illustrations from the mouth as well as from any other part of the body.

Dr. Patterson introduces the subject of biology. The amount of biology that we give in our course is not very great. Of course, biology is taught as an introduction to physiology and to histology and to pathology. Before we begin to teach dental pathology, a

course of five lectures, or sometimes as high as six or seven lectures, according to general conditions, are given in general biology.

REPORT OF THE DENTAL INDEX BUREAU.

At a meeting of the Dental Index Bureau various plans for indexing were discussed and Drs. G. S. Millberry, A. B. Crane and S. W. Bowles were appointed a committee to consult with the office of the Surgeon-General in regard to the work.

The following officers were elected: Dr. G. W. Dittmar, Chairman; Dr. J. O. McCall, secretary-treasurer.

The treasurer's report:

Total Subscribers	64
Balance Cash in Bank, Jany. 1st, 1915	$347.17
Interest to Jan. 1st, 1916	10.51
Total	$357.68
Amount Due on Subscriptions	537.50

JOHN OPPIE McCALL,
Secretary-Treasurer.

DISCUSSION OF FOUR-YEAR COURSE.

President H. M. Semans, Columbus — To those desiring to participate we will now grant the privilege of discussing the four-year course. At the opening of the session, to which I called your attention, there was a tendency to get off from the subject under consideration, yet not getting far away from the subject after all, because the purpose of the reports of the various committees was to give us something of an idea as to what we should do in our four-year course. And so those of you who feel that you have something to say, perhaps with reference to ideas that you may have grasped in the past day or two, liberty to tell the rest of us about it is now given you.

Dr. E. C. Kirk, Philadelphia — In giving attention to several of the discussions with reference to the disposition of our time in this proposed four-year course, it has seemed to me that we have concentrated our attention too much upon the question of details, and a great deal of wordy discussion has taken place over the details of the suggested curriculum for the four-year course. However, as an offset to that, there have been various exceptions, and

one in particular that has epitomized to my mind the whole situation, and that is the remark made by Dr. Willmott that wherever two deans were gathered together, there you would have two curricula; and that being an underlying principle with a broad swing to it, it is a simple matter to apply the principle involved and deduce what would necessarily happen when we have forty-five deans gathered together. All of which means, I think, that we fully realize that there must be given to each school a liberal latitude in the matter of developing the individuality, if I may use that term, not only of the teachers, but also of the character of the output of that institution. Dean Owre has voiced the same sentiment in another direction, and that is that each school is to a certain large extent serving in an educational way the community in which it is located. We recognize that fact not only in dental schools, but in universities. Dentistry itself is specializing, and for that reason also we must have some latitude of action in the development of our curriculum. From all of which I deduce this: That it is quite useless for us to attempt to secure absolute uniformity in the curricula of the various dental schools, we cannot make them absolutely uniform. The curriculum of each school will have some distinctive characteristics, and it is exactly those distinctive characteristics that are most valuable.

When we come to think of it, we are not creating dentists in the way that a nation creates units for naval or military service. Dentists are not men cast in molds, but thinking men that are obliged to meet conditions as they arise, and they must have originality and flexibility of resource. Therefore we cannot by the very nature of the case hope to secure absolute uniformity either in regard to the curriculum or in regard to the details comprising that curriculum.

As Dean Owre has said, last June in Chicago, at the request of President James of the University of Illinois, a number of schools were invited to discuss this question, and we spent considerable time upon that problem and upon nothing else, and the conclusions which I have briefly outlined to you were arrived at under those circumstances. In order that we might have that latitude which we all feel is required, with the helpful suggestion of President Vincent of Minnesota, a resolution was introduced and adopted which covered the situation, and I am going to read that resolution for your consideration and for formal adoption by this body if you see fit to do so. It seems to me it will give us at least

a normal basis on which we can all unite, and leave hands and minds free to develop the curriculum in each case as our best judgment may dictate.

The resolution as adopted in Chicago, while it does not represent the view of all the institutions in this country, is as follows:

"RESOLVED, That it is the sense of this meeting that we approve the plan of a Four-Year Course of not less than 4800 working hours, the curriculum to consist of not less than 4200 hours devoted to such subjects as are deemed essential to the technical and scientific education of the dental practitioner, with the understanding that ancillary subjects shall be elective and not consume more than 600 hours of the course."

I have been somewhat uncertain in my own mind as to the exact meaning of the word "ancillary," and Dr. Anthony, my associate, has taken the trouble to go out and investigate all the dictionaries in Minneapolis, and I have his report thereon. I offer it for the benefit of those who do not know any more about "ancillary" than I do:

"*Ancillary*: Of or pertaining to a maid servant. Hence, subservient, subordinate, like a hand-maiden; auxiliary. As related to law it means subordinate to it in aid of any primary or principal office or officer, as an auxiliary attachment bill or suit, as secondary to a principal proceeding. Ancillary administration is the subordinate administration of assets usually granted in a state or country other than that in which the deceased person was domiciled. Ancillary, serving as an aid or accessory; subsidiary; auxiliary; secondary."

As ancillary subjects therefore means practically auxiliary subjects, it was intended by means of this resolution to make provision for ancillary subjects; so that those who want to do so may be allowed to put in the dental course rhetoric, biology, or anything else they may choose, but with the proviso that they must put such subjects in as elective courses and that the totality of those ancillary subjects must not consume any more than 600 hours out of the 4800 hours of the whole course.

In passing a resolution of this sort, we necessarily pledge ourselves first, to a four-year dental course after high school graduation, and that 4200 hours of that course shall be devoted to those subjects which belong strictly to the technical and scientific education of the dental practitioner and that we may add any ancillary

subjects up to 600 additional hours which in the judgment of any faculty may enhance the usefulness of the course.

(Upon motion, carried unanimously, the resolution introduced by Dr. Kirk was adopted.)

Dr. A. D. Black, Chicago — I simply want to say a word in connection with one phase of this resolution, that there may be no misunderstanding in regard to it. The statement is made that this additional 600 hours would be elective. I think those of us who were present at the meeting held in Chicago last June, understand that the word *elective* does not apply in any way to the student, but to the school; that the school may select 4200 hours of subjects deemed essential to the technical and scientific education of the dental practitioner, and another 600 hours the school may select from the great variety of ancillary subjects, but that the student has no elective privilege in this matter whatsoever; that he takes the 4200 hours of dental subjects prescribed, and also the 600 hours of such ancillary studies as the faculty may select.

Dr. J. H. Kennerly, St. Louis — Just one point that has perhaps been lost sight of in the resolution. It is stated therein that *not less* than 4200 hours shall be devoted to this work, but it does not say that 4600 hours shall not be devoted to it. The point I want to make is that if schools see fit to consume only 200 hours in ancillary subjects, their students can make the 4600 hours of subjects that do directly pertain to dental instruction.

There have been some objections on the part of certain speakers to the adoption of certain subjects proposed in some of the curricula so far advanced. But this resolution does not bind any one to teach ancillary subjects at all. It simply states that they shall not devote more than 600 hours to ancillary subjects in case they want to teach this much, but that there *must be* 4200 hours of subjects "deemed essential to the technical and scientific education of the dental practitioner," and, as I understand it, they may teach 4800 hours of these subjects if they want to.

Dr. A. H. Hipple, Omaha — I would like to know about the school that teaches 4200 hours of subjects necessary for the education of a dentist, and nothing more. Does that come within the spirit and letter of this resolution?

President Semans: This resolution calls for 4800 hours of instruction.

Dr. W. E. Willmott, Toronto

During this meeting I have kept count of the various reports that have been presented by the special committees appointed, and it has been suggested that it might be interesting to this body to present a brief summary of the recommendations made therein. There is a tendency on the part of every teacher to think that he has not sufficient time at his disposal, and he is always asking for more time no matter what the subject. And, bearing in mind this tendency, I simply want to call attention to the conservative and sane reports that we have received and the generous treatment that these professors have given to departments in which they are not particularly interested. All these reports combined take only 173 hours more than the allotted 4800 hours, without any consultation between the different committees.

In comparing the results we will note simply the percentages:

In report of committee on operative dentistry and dental anatomy, 23.8 per cent.

In report of committee on prosthetic dentistry, orthodontia, crown and bridge work, 32.8 per cent.

In report of committee on oral surgery, anesthesia, physical diagnosis and radiography, 3.3 per cent.

In report of committee on anatomy, histology and physiology, 13.2 per cent.

In report of committee on chemistry, metallurgy and physics, 14.3 per cent.

In report of committee on materia medica and therapeutics, 1.9 per cent.

In report of committee on general pathology, dental pathology and bacteriology, 5.7 per cent.

Comparing these percentages with some of the suggested arrangements of the dental course, it seems to work out almost on the same basis.

Dr. Arthur B. Crane, Washington

I had something to say Tuesday afternoon relative to the poorly trained, often incompetent teachers that we have in the dental infirmaries and laboratories of most of our schools, and whom we have to accept. I have a constructive suggestion to offer to this body for your consideration, either now or perhaps at the next meeting. There has occurred to me an idea which I have discussed with others and which has met with rather favorable response. It is, to have post-graduate instruction for the purpose of developing a trained corps of dental teachers.

The scheme in brief is as follows: At the beginning of the dental course an announcement should be made that a certain number of men who during the four years developed a sufficiently high standard, would be given a year's post-graduate course as a scholarship, this one year's post-graduate course to be taken in some specialty to which the particular student seems to be especially inclined; at the end of one year of post-graduate instruction these men to agree to accept for a period of one year or more a position as associate demonstrator in that particular subject in the school which gives them the course.

Along that line, in coming up on the train, Dr. Kirk suggested to me that if this were a good thing it might be made very much more extensive by an interchange of those scholarships; for instance, a man graduating and receiving his scholarship from our school, could take his post-graduate work in your school, and from your school could take the course in our school.

APPENDIX.

CONSTITUTION AND BY-LAWS.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

FORMERLY

INSTITUTE OF DENTAL PEDAGOGICS.

Organized at The World's Columbia Dental Congress, Chicago, 1893.

Revised Constitution and By-Laws.

ARTICLE I.

Name and Object.

Section 1. This association shall be known as the "American Institute of Dental Teachers."

Sec. 2. Its object shall be the improvement of the educational department of the colleges comprising its membership, by interchange of thought and formulation of methods.

ARTICLE II.

Officers and Standing Committee.

Section 1. The officers shall be a President, Vice-President and Secretary-Treasurer, the same to be selected from the active members and elected by a majority ballot at the annual meeting.

Sec. 2. There shall be one standing committee of three members, which shall be known as the Executive Board, the same to be elected by a majority ballot at the annual meeting.

Sec. 3. The Executive Board shall be elected and serve as follows: At each annual meeting there shall be one member elected to serve for three years.

ARTICLE III.

Meetings and Quorum.

Section 1. The regular meeting shall be held at such time and place as may be decided upon by the Executive Board.

Sec. 2. On the written application of the representatives of seven colleges the President may, on thirty days' notice, call special meetings to be held at such places as may be most convenient.

Sec. 3. Representatives from ten colleges shall constitute a quorum.

ARTICLE IV.

Members and Dues.

Section 1. Any college in the United States or Canada which complies fully with all the requirements of the National Association of Dental Faculties as regards educational standards, is eligible to apply for membership in this body.

Sec. 2. Active members shall consist of accredited representatives from the teaching staff of the colleges holding membership.

Sec. 3. Each college holding membership in this body may be represented by one or more of its teaching staff as its representatives, and such representatives shall be entitled to all the privileges of the Institute, except that no college shall cast more than one vote on any matter acted on by the Institute.

Sec. 4. Any teacher having been an accredited delegate to this body for three or more years from a school in good standing, may, in the event of withdrawing from the faculty, of such school, be made a permanent member —without vote—by a two-thirds affirmative vote of the members present.

Sec. 5. The annual dues shall be twenty dollars ($20.00) from each

college, payable in advance. **The dues of a college must be paid before its representative can take part in the proceedings of the Institute.**

ARTICLE V.

Applications for Membership.

Section 1. Applications for membership shall be presented in writing at any annnual meeting. This shall be referred to the Executive Board.

Sec. 2. A favorable report from the Executive Board followed by a favorable vote of two-thirds of the voting representatives present, is necessary to elect the applicant to membership.

ARTICLE VI.

Funds.

Section 1. All funds shall be applied to the necessary expense of the Institute and shall be paid out by the Secretary-Treasurer as ordered or as bills are approved by two members of the Executive Board.

ARTICLE VII.

Alterations and Amendments.

Section 1. Any amendment to the Constitution or By-Laws shall be proposed in writing at a regular meeting. It shall lie over until the next annual meeting and every active member shall be notified of such proposed amendment, when it may be adopted by an affirmative vote of two-thirds of the active members present.

ARTICLE VIII.

Section 1. Roberts' Rules of Order shall be the authority governing this body.

BY-LAWS.

ARTICLE I.

Duties of Officers.

Section 1. The duties of the President and Vice-President shall be such as usually pertain to these offices in similar organizations.

Sec. 2. The duties of the Secretary-Treasurer shall be such as pertain to the office of Secretary and Treasurer in similar organizations.

Sec. 3. The President and Secretary-Treasurer shall render an annual report.

ARTICLE II.

Duties of Executive Board.

Section 1. The Executive Board shall receive and act upon all applications for membership. It shall receive and act upon all bills presented to the Institute. It shall provide a program for each regular meeting, which shall be in the nature of papers, exhibits or reports from members upon the several topics pertaining to Dental Pedagogics.

Sec. 2. It shall attend to all business of the Institute and render an annual report of its transactions, which shall be published.

Sec. 3. It shall select the place for each meeting and provide the necessary arrangements.

ARTICLE III.

Loss of Membership.

Section 1. Any college that is in arrears for two years' dues shall be dropped from the roll.

Sec. 2. Any college dropped from the roll for the cause mentioned in Section 1 of this Artice shall be required to pay all dues owing at the time it was dropped before it can be voted on for reinstatement.

ARTICLE IV.

Master of Exhibits.

Section 1. At each annual meeting the executive Board shall appoint a Master of Exhibits to serve until the close of the next annual meeting. He shall have full charge of the exhibits and shall make a report to the Institute.

Sec. 2. The Master of Exhibits shall have power to appoint such assistants as he may deem necessary.

APPENDIX A.

MEMBERS IN ATTENDANCE.

(Taken from Secretary's Register.)

Dr. A. D. Black, Northwestern University Dental School.
Dr. C. R. E. Koch, Northwestern University Dental School.
Dr. F. W. Gethro, Northwestern University Dental School.
Dr. William Bebb, Northwestern University Dental School.
Dr. C. A. Alcorn, Northwestern University Dental School.
Dr. Alfred Owre, College of Dentistry, University of Minnesota.
Dr. T. B. Hartzell, College of Dentistry, University of Minnesota.
Dr. H. A. Maves, College of Dentistry, University of Minnesota.
Dr. W. F. Lasby, College of Dentistry, University of Minnesota.
Dr. H. C. Lawton, College of Dentistry, University of Minnesota.
Dr. Henry Schoff, College of Dentistry, University of Minnesota.
Dr. M. O. Pattridge, College of Dentistry, University of Minnesota.
Dr. P. J. Brekhus, College of Dentistry, University of Minnesota.
Dr. G. M. Damon, College of Dentistry, University of Minnesota.
Dr. H. W. Morgan, Vanderbilt University, Department of Dentistry.
Dr. J. H. Phillips, Vanderbilt University, Department of Dentistry.
Dr. A. E. Webster, Royal College of Dental Surgeons.
Dr. W. E. Willmott, Royal College of Dental Surgeons.
Dr. J. W. Coram, Royal College of Dental Surgeons.
Dr. A. J. McDonagh, Royal College of Dental Surgeons.
Dr. I. H. Ante, Royal College of Dental Surgeons.
Dr. R. D. Thornton, Royal College of Dental Surgeons.
Dr. A. D. Mason, Royal College of Dental Surgeons.
Dr. Thos. Cowling, Royal College of Dental Surgeons.
Dr. H. M. Lancaster, Royal College of Dental Surgeons.
Dr. W. C. Smith, Royal College of Dental Surgeons.
Dr. T. W. Brophy, Chicago College of Dental Surgery.
Dr. W. H. G. Logan, Chicago College of Dental Surgery.
Dr. F. E. Roach, Chicago College of Dental Surgery.
Dr. C. E. Jones, Chicago College of Dental Surgery.
Dr. R. W. Bunting, University of Michigan, College of Dental Surgery.
Dr. M. L. Ward, University of Michigan, College of Dental Surgery.
Dr. F. C. Cole, University of Michigan, College of Dental Surgery.
Dr. H. S. Bailey, University of Michigan, College of Dental Surgery.
Dr. H. T. Smith, Ohio College of Dental Surgery.
Dr. G. S. Millberry, University of California, College of Dentistry.

Dr. R. H. Volland, University of Iowa, College of Dentistry.
Dr. H. J. Oltfillisch, University of Iowa, College of Dentistry.
Dr. Richard Summa, University of Iowa, College of Dentistry.
Dr. B. A. Weber, University of Iowa, College of Dentistry.
Dr. F. R. Henshaw, Indiana Dental College.
Dr. H. R. Raper, Indiana Dental College.
Dr. J. D. Patterson, Kansas City Dental College.
Dr. Martin Dewey, Kansas City Dental College.
Dr. D. H. Squire, University of Buffalo, Dental Department.
Dr. Abram Hoffman, University of Buffalo, Dental Department.
Dr. E. H. Long, University of Buffalo, Dental Department.
Dr. C. K. Buell, University of Buffalo, Dental Department.
Dr. E. C. Kirk, The Thomas W. Evans Museum & Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Herman Prinz, The Thomas W. Evans Museum & Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. H. M. Semans, Ohio State University, College of Dentistry.
Dr. C. H. Hebble, Ohio State University, College of Dentistry.
Dr. H. V. Cottrell, Ohio State University, College of Dentistry.
Dr. E. W. Martindale, Ohio State University, College of Dentistry.
Dr. J. H. Kennerly, Washington University Dental Department.
Dr. H. E. Friesell, University of Pittsburgh, School of Dentistry.
Dr. H. S. Haslett, University of Pittsburgh, School of Dentistry.
Dr. W. L. Fickes, University of Pittsburgh, School of Dentistry.
Dr. J. S. Ashbrook, University of Pittsburgh, School of Dentistry.
Dr. O. L. Hertig, University of Pittsburgh, School of Dentistry.
Dr. F. C. Friesell, University of Pittsburgh, School of Dentistry.
Dr. J. F. Biddle, University of Pittsburgh, School of Dentistry.
Dr. Robert Zugsmith, University of Pittsburgh, School of Dentistry.
Dr. C. O. Booth, University of Pittsburgh, School of Dentistry.
Dr. J. C. Hipple, University of Pittsburgh, School of Dentistry.
Dr. L. W. Ohl, University of Pittsburgh, School of Dentistry.
Dr. E. C. Shryock, University of Pittsburgh, School of Dentistry.
Dr. A. B. French, University of Pittsburgh, School of Dentistry.
Dr. H. C. Metz, University of Pittsburgh, School of Dentistry.
Dr. A. R. Starr, New York College of Dentistry.
Dr. Ellison Hillyer, New York College of Dentistry.
Dr. F. B. Moorehead, University of Illinois, College of Dentistry.
Dr. D. M. Gallie, University of Illinois, College of Dentistry.
Dr. F. B. Noyes, University of Illinois, College of Dentistry.
Dr. G. W. Dittmar, University of Illinois, College of Dentistry.
Dr. W. H. Welker, University of Illinois, College of Dentistry.

Dr. J. C. McGuire, University of Illinois, College of Dentistry.
Dr. J. E. Nyce, College of Dental and Oral Surgery, New York.
Dr. W. S. Russell, College of Dental and Oral Surgery, New York.
Dr. L. E. Ford, University of Southern California, College of Dentistry.
Dr. A. W. Starbuck, Colorado College of Dental Surgery.
Dr. F. W. Frahm, Colorado College of Dental Surgery.
Dr. E. A. Johnson, Tufts College Dental School.
Dr. F. A. Delabarre, Tufts College Dental School.
Dr. James Keltie, Tufts College Dental School.
Dr. S. W. Bowles, Georgetown University, Dental Department.
Dr. D. E. Morrow, Barnes Dental College.
Dr. Eudore Dubeau, Laval University, Dental Department.
Dr. A. H. Hipple, Creighton University, College of Dentistry.
Dr. E. A. Bruening, Creighton University, College of Dentistry.
Dr. J. A. C. Hoggan, Medical College of Virginia, Dental Department.
Dr. R. R. Byrnes, Medical College of Virginia, Dental Department.
Dr. D. M. Cattell, University of Tennessee, College of Dentistry.
Dr. A. W. Thornton, McGill University, Department of Dentistry.
Dr. E. H. Smith, Harvard University Dental School.
Dr. W. P. Cooke, Harvard University Dental School.
Dr. A. B. Crane, George Washington University, Department of Dentistry.
Dr. H. C. Miller, North Pacific College of Dentistry.
Dr. A. A. Jennings, Marquette University, Dental School.
Dr. R. A. Hankohl, Marquette University, Dental School.
Dr. J. A. Gorman, Loyola University, School of Dentistry.

APPENDIX B.

MEMBERSHIP COLLEGES WITH REPRESENTATIVES PRESENT.

Northwestern University Dental School.
College of Dentistry, University of Minnesota.
Vanderbilt University, Department of Dentistry.
Royal College of Dental Surgeons.
Chicago College of Dental Surgery.
University of Michigan, College of Dental Surgery.
Ohio College of Dental Surgery.
University of California, College of Dentistry.
University of Iowa, College of Dentistry.
Indiana Dental College.
Kansas City Dental College.

University of Buffalo, Dental Department.
The Thomas W. Evans Museum & Dental Institute, School of Dentistry, University of Pennsylvania.
Ohio State University, College of Dentistry.
Washington University, Dental Department.
University of Pittsburgh, School of Dentistry.
New York College of Dentistry.
University of Illinois, College of Dentistry.
College of Dental & Oral Surgery, New York.
University of Southern California, College of Dentistry.
Colorado College of Dental Surgery.
Tufts College Dental School.
Georgetown University, Dental Department.
Barnes Dental College.
Laval University, Dental Department.
Creighton University, College of Dentistry.
Medical College of Virginia, Dental Department.
University of Tennessee, College of Dentistry.
McGill University, Department of Dentistry.
Harvard University Dental School.
George Washington University, Department of Dentistry.
North Pacific College of Dentistry.
Marquette University Dental School.
Loyola University, School of Dentistry.

APPENDIX C.

MEMBERSHIP COLLEGES NOT REPRESENTED.

Louisville College of Dentistry.
Western Reserve University, School of Dentistry.
Baltimore College of Dental Surgery.
Philadelphia Dental College.
Cincinnati College of Dental Surgery.
St. Louis Dental College.
Tulane University, College of Dentistry.
Howard University, Dental Department.
Medico-Chi. of Philadelphia, Department of Dentistry.
University of Maryland, Dental Department.
Meharry Dental College.
Dalhousie University, Faculty of Dentistry.
Western Dental College.
Southern Dental College.

OFFICERS AND COMMITTEES OF THE ENSUING YEAR.

President.

Dr. Shirley W. Bowles, 1616 I Street, Washington, D. C.

Vice-President.

Dr. John F. Biddle, 517 Arch Street, Pittsburgh, Pa.

Secretary-Treasurer.

Dr. Abram Hoffman, 529 Franklin Street, Buffalo, N. Y.

Executive Board.

Dr. A. W. Thornton, McGill University, Montreal, Canada.
Dr. R. W. Bunting, Ann Arbor, Michigan.
Dr. A. D. Black, Chicago, Ill.

Local Committee of Arrangements.

Dr. R. Hamill D. Swing, 703 N. 40th. Street, Philadelphia, Pa.
Dr. F. S. Rusca, Philadelphia.
Dr. William J. McKinley, Philadelphia.

Master of Exhibits.

Dr. C. H. Hebble, 830 South High Street, Columbus, Ohio.

Assistant.

Dr. Dudley Guilford, 124 South 18th. Street, Philadelphia, Pa.

Commission on Nomenclature.

Dr. F. B. Moorehead, 1470 Peoples Gas Building, Chicago, Ill.
Dr. M. L. Ward, Ann Arbor, Michigan.
Dr. W. H. Welker, Chicago, Ill.

Commission on Text-Books.

Dr. Ellison Hillyer, 1143 Dean Street, Brooklyn, N. Y.
Dr. A. E. Webster, Toronto, Canada.
Dr. C. J. Grieves, Baltimore, Maryland.

Commission on Operative Technics.

Dr. C. H. Hebble, 830 South High Street, Columbus, Ohio.
Dr. E. D. Coolidge, Chicago, Ill.
Dr. J. M. Walls, Minneapolis, Minnesota.

Commission on Prosthetic Technics.

Dr. W. E. Willmott, 96 College Street, Toronto, Canada.
Dr. F. E. Roach, Chicago, Ill.
Dr. G. S. Cameron, Montreal, Canada.

LIST OF DENTAL COLLEGES

MEMBERS OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS.

The following list of Dental Colleges, together with their respective Deans, is given in the order in which the Colleges joined the Institute:

	Year of Admission	School	Dean	City
1.	1894	Northwestern University, Dental School	Dr. Thomas L. Gilmer	Chicago
2.	1894	College of Dentistry, University of Minnesota	Dr. Alfred Owre	Minneapolis
3.	1894	Vanderbilt University, Department of Dentistry	Dr. Henry W. Morgan	Nashville
4.	1894	Louisville College of Dentistry	Dr. Wm. E. Grant	Louisville
5.	1894	Royal College of Dental Surgeons	Dr. A. E. Webster	Toronto
6.	1894	Western Reserve University, School of Dentistry	Dr. Edward E. Belford	Cleveland
7.	1894	Chicago College of Dental Surgery	Dr. Truman W. Brophy	Chicago
8.	1894	University of Michigan, College of Dental Surgery	Dr. N. S. Hoff	Ann Arbor
9.	1894	Ohio College of Dental Surgery	Dr. H. T. Smith	Cincinnati
10.	1894	University of California, College of Dentistry	Dr. G. S. Millberry	San Francisco
11.	1895	University of Iowa, College of Dentistry	Dr. F. T. Breene	Iowa City
12.	1895	Indiana Dental College	Dr. F. R. Henshaw	Indianapolis
13.	1895	Kansas City Dental College	Dr. J. D. Patterson	Kansas City
14.	1895	University of Buffalo, Dental Department	Dr. D. H. Squire	Buffalo
15.	1895	The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania	Dr. E. C. Kirk	Philadelphia
16.	1896	Baltimore College of Dental Surgery	Dr. W. G. Foster	Baltimore
17.	1896	Philadelphia Dental College	Dr. S. H. Guilford	Philadelphia
18.	1896	Cincinnati College of Dental Surgery	Dr. G. S. Junkerman	Cincinnati
19.	1896	St. Louis Dental College	Dr. J. P. Harper	St. Louis
20.	1897	Ohio State University, College of Dentistry	Dr. H. M. Semans	Columbus
21.	1897	Washington University, Dental Department	Dr. J. H. Kennerly	St. Louis
22.	1898	University of Pittsburgh, School of Dentistry	Dr. H. E. Friesell	Pittsburgh
23.	1898	New York College of Dentistry	Dr. A. R. Starr	New York City
24.	1900	University of Illinois, College of Dentistry	Dr. F. B. Moorehead	Chicago
25.	1901	Tulane University, College of Dentistry	Dr. Wallace Wood, Jr.	New Orleans
26.	1903	College of Dental and Oral Surgery, New York	Dr. William Carr	New York City
27.	1903	University of Southern California, College of Dentistry	Dr. Lewis E. Ford	Los Angeles
28.	1903	Howard University, Dental Department	Dr. Edw. A. Balloch	Washington, D. C.
29.	1903	Colorado College of Dental Surgery	Dr. H. A. Fynn	Denver
30.	1903	Tufts College Dental School	Dr. C. F. Painter	Boston
31.	1905	Georgetown University, Dental Department	Dr. Shirley W. Bowles	Washington, D. C.
32.	1905	Medico-Chi, of Philadelphia, Department of Dentistry	Dr. I. N. Broomell	Philadelphia
33.	1909	Barnes Dental College	Dr. George H. Owen	St. Louis
34.	1909	Laval University, Dental Department	Dr. Eudore Dubeau	Montreal
35.	1910	Creighton University, College of Dentistry	Dr. A. H. Hipple	Omaha
36.	1911	Medical College of Virginia, Dental Department	Dr. J. A. C. Hoggan	Richmond

	Year of Admission	School	Dean	City
37.	1911	University of Tennessee, College of Dentistry	Dr. J. A. Gardner	Memphis
38.	1911	McGill University, Department of Dentistry	Dr. A. W. Thornton	Montreal
39.	1911	University of Maryland, Dental Department	Dr. T. O. Heatwole	Baltimore
40.	1912	Meharry Dental College	Dr. G. W. Hubbard	Nashville
41.	1912	Dalhousie University, Faculty of Dentistry	Dr. Frank Woodbury	Halifax, N. S.
42.	1912	Harvard University Dental School	Dr. Eugene Smith	Boston
43.	1913	Western Dental College	Dr. Wm. J. Brady	Kansas City
44.	1913	George Washington University, Department of Dentistry	Dr. J. Roland Walton	Washington, D. C.
45.	1913	North Pacific College of Dentistry	Dr. Herbert C. Miller	Portland
46.	1915	Marquette University, Dental School	Dr. H. L. Banzhaf	Milwaukee
47.	1915	Southern Dental College	Dr. S. W. Foster	Atlanta
48.	1915	Loyola University, School of Dentistry	Dr. C. V. Vignes	New Orleans

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A FOUR-YEAR DENTAL CURRICULUM.

Supplementing the President's Address.

A—Credit hours.
B—Teaching, lecturing or quizzing hours.
C—Laboratory or clinic hours.
D—Total clock hours.

	A	B	C	D	A	B	C	D	
FRESHMAN YEAR									
*Biology	3	2	2	64	3	1	5	96	
Dental Anatomy	0	0	0	00	2	1	3	64	
**Chemistry	4	2	6	128	4	2	6	128	
***Technical Drawing	2	0	4	64	3	1	4	80	
Prosthetic Dentistry	4	1	9	160	4	1	9	160	
****English	2	2	0	32	2	2	0	32	
	15	7	21	448	18	8	27	560	1008
SOPHOMORE YEAR									
Anatomy	6	4	6	160	6	4	6	160	
Anatomy, Dental	1	0	3	48	0	0	0	000	
Histology	3	2	3	80	3	2	3	80	
Chemistry, Organic	2	1	3	64	0	0	0	000	
Chemistry, Physiological	0	0	0	00	1	1	0	16	
Bacteriology	0	0	0	00	4	2	6	128	
Metallurgy	2	1	3	64	0	0	0	000	
Prosthetic Dentistry	3	1	6	112	3	1	6	112	
Operative Dentistry	1	0	3	48	1	0	3	48	
	18	9	27	576	18	10	24	544	1120
JUNIOR YEAR									
Crown and Bridge	3	1	6	112	2	1	3	64	
Operative Dentistry	1	1	0	16	1	1	0	16	
Porcelain	0	0	0	00	1	0	3	48	
Dental Medicine	1	1	0	16	1	1	0	16	
Oral Hygiene	1	1	0	16	0	0	0	00	
Pathology, General and Special	3	1	6	112	1	1	0	16	
Physiology	3	2	3	80	3	2	3	80	
Prosthetic Dentistry	1	0	3	48	1	0	3	48	
Orthodontia	0	0	0	000	2	1	3	64	
*****Practice	5	0	15	240	6	0	18	288	
	18	7	33	640	18	7	33	640	1280

SENIOR YEAR									
Crown and Bridge	1	1	0	16	1	1	0	16	
Anesthetics	1	1	0	16	1	1	0	16	
Dental Medicine	1	1	0	16	1	1	0	16	
Operative Dentistry	1	1	0	16	0	0	0	00	
Oral Surgery	1	1	0	16	1	1	0	16	
Orthodontia	1	1	0	16	0	0	0	00	
Radiography Economics Ethics Jurisprudence	0	0	0	00	1	2	0	32	
*****Practice	12	0	36	576	12	0	36	576	
	18	6	36	672	18	6	36	672	1344
									†4752

*Elementary Zoology, 1st semester and Comparative Anatomy, 2nd semester.

**If credit is granted for previous work, then Advanced General Chemistry or Botany or Physics may be taken at option of Entrance Board.

***Engineering Drawing; Elementary projections, lettering and advanced projections.

****Description, Narration, Exposition and Argumentation.

*****All infirmary work on patients, and clinical observation in Oral Surgery, Radiography and Anesthetics.

†The remaining 48 hours, to make up the 4800, to be elective (Public Speaking or Psychology).

PROCEEDINGS

OF THE

Twenty-Fourth Annual Meeting

OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS

HELD AT

PHILADELPHIA, PENNSYLVANIA

January Twenty-Third, Twenty-Fourth and Twenty-Fifth, Nineteen Hundred and Seventeen

Serial
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1917
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Published by

American Institute of Dental Teachers

NEXT MEETING, INDIANAPOLIS, INDIANA

JANUARY 29, 30 and 31 - - 1918

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Published by

American Institute of Dental Teachers

ABRAM HOFFMAN, Secretary-Treasurer

529 Franklin Street, - Buffalo, N. Y.

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LIST OF OFFICERS OF THE AMERICAN INSTITUTE OF DENTAL TEACHERS

FORMERLY INSTITUTE OF DENTAL PEDAGOGICS

From Date of Organization — **Organized at Chicago, August 18th, 1893**

TEMPORARY CHAIRMAN—H. A. Smith, Cincinnati

TEMPORARY SECRETARY—J. A. Dale

Annual Meeting	Year	Place	President	Vice-President	Secretary-Treasurer
1	1893	Chicago, Ill.	D. M. Cattell, Chicago		J. A. Dale
2	1894	Old Point Comfort, Va.	D. M. Cattell, Chicago	T. E. Weeks, Minneapolis	J. F. Stephan, Cleveland
3	1895	Asbury Park, N. J.	T. E. Weeks, Minneapolis	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
4	1896	Saratoga, N. Y.	H. W. Morgan, Nashville	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
5	1897	Chicago, Ill.	G. V. Black, Chicago	N. S. Hoff, Ann Arbor	D. M. Cattell, Chicago
6	1898	Cincinnati, O.	N. S. Hoff, Ann Arbor	H. P. Carlton, California	H. J. Goslee, Chicago
7	1899	Philadelphia, Pa.	H. P. Carlton, California	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago
8	1900	Nashville, Tenn.	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago	H. B. Tileston, Louisville
9	1901	Pittsburgh, Pa.	H. J. Goslee, Chicago	J. D. Patterson, Kansas City	H. B. Tileston, Louisville
10	1902	Chicago, Ill.	J. D. Patterson, Kansas City	H. B. Tileston, Louisville	W. E. Willmott, Toronto
11	1903	Buffalo, N. Y.	H. B. Tileston, Louisville	H. W. Whitslar, Cleveland	W. E. Willmott, Toronto
12	1904	Louisville, Ky.	S. H. Guilford, Philadelphia	D. R. Stubblefield, Nashville	W. E. Willmott, Toronto
13	1905	New York City	D. R. Stubblefield, Nashville	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto
14	1906	Chicago, Ill.	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto	B. E. Lischer, St. Louis
15	1907	New Orleans, La.	W. E. Willmott, Toronto	Ellison Hillyer, Brooklyn	B. E. Lischer, St. Louis
16	1908	St. Louis, Mo.	Ellison Hillyer, Brooklyn	John Q. Byram, Indianapolis	B. E. Lischer, St. Louis
17	1909	Toronto, Canada	John Q. Byram, Indianapolis	D. M. Gallie, Chicago	Fred W. Gethro, Chicago
18	1910	Washington, D. C.	D. M. Gallie, Chicago	H. E. Friesell, Pittsburgh	Fred W. Gethro, Chicago
19	1912	Chicago, Ill.	H. E. Friesell, Pittsburgh	D. H. Squire, Buffalo	Fred W. Gethro, Chicago
20	1913	Pittsburgh, Pa.	D. H. Squire, Buffalo	Fred W. Gethro, Chicago	John F. Biddle, Pittsburgh
21	1914	Buffalo, N. Y.	Fred W. Gethro, Chicago	H. M. Semans, Columbus	John F. Biddle, Pittsburgh
22	1915	Ann Arbor, Mich.	H. M. Semans, Columbus	S. W. Bowles, Washington D. C.	John F. Biddle, Pittsburgh
23	1916	Minneapolis, Minn.	S. W. Bowles, Washington, D.C.	John F. Biddle, Pittsburgh	Abram Hoffman, Buffalo
24	1917	Philadelphia, Pa.	John F. Biddle Pittsburgh	A. W. Thornton, Montreal	Abram Hoffman, Buffalo

TWENTY-FOURTH ANNUAL MEETING

OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS.

MINUTES

The twenty-fourth annual meeting of the American Institute of Dental Teachers convened at the Hotel Adelphia, Philadelphia, Tuesday morning, January 23rd, 1917.

The meeting was called to order by President Shirley W. Bowles at 10 o'clock.

Dr. Edgar F. Smith, Provost of the University of Pennsylvania, gave an address of welcome (see page 10), response being made by Dr. F. B. Moorehead, Chicago (see page 13).

Calling Vice-President Biddle to preside, the President then read his address (see page 14), which was discussed by Drs. G. S. Millberry, T. W. Brophy, A. D. Black, H. L. Wheeler, and Alfred Owre, Dr. Bowles closing the discussion. The President resumed the chair.

The Secretary-Treasurer presented his report (see page 35), which was accepted, the Treasurer's report being referred to the Executive Board for auditing.

Dr. F. B. Moorehead, Chairman of the Commission on Nomenclature, presented his report (see page 37), which was discussd by Drs. A. E. Webster, G. S. Millberry, Ellison Hillyer, T. W. Brophy, W. G. Foster, J. F. Biddle and J. D. Patterson, the essayist, in closing, answering the various questions and suggestions made.

The President referred the report of the Commission on Nomenclature and the recommendations contained therein to the Executive Board for its consideration, the conclusions reached to be reported to the Institute at a later session.

TUESDAY AFTERNOON.

The meeting was called to order by the President at 2:30 o'clock.

The Secretary read the minutes of the morning session, which were approved.

Dr. Alfred Owre, Minneapolis, Minn., read a paper on "The Teaching of the Ancillary and the So-Called Medical Subjects in the Four Year Dental Course" (see page 38). Discussed by Drs. E. C. Kirk, I. N. Broomell, F. B. Moorehead, T. W. Brophy, Joseph Nolin, H. M. Semans, H. E. Friesell, and A. H. Hipple, Dr. Owre closing the discussion.

Dr. D. M. Cattell, Memphis, announced that on June 19-22, 1917, the State Dental Association of Tennessee will hold its Fiftieth Anniversary meeting at Memphis, and cordially invited the members of the Institute to be present on that occasion.

Dr. W. E. Willmott, Toronto, also extended an invitation to the members to be present May 21st next at the meeting of the Ontario Dental Society, which will celebrate its Fiftieth Anniversary at that time.

TUESDAY EVENING.

The meeting was called to order by the President at 8:30 o'clock.

The Secretary read the minutes of the afternoon session, which were approved.

Dr. F. W. Gethro, Chicago, read a paper on "The Harmonizing of the Four Year Curricula" (see page 75). Discussed by Drs. S. H. Guilford, J. H. Kennerly, H. M. Semans, F. C. Waite, A. D. Black, B. Holly Smith, T. W. Brophy, Joseph Nolin, and J. O. McCall, Dr. Gethro closing the discussion.

Dr. E. C. Kirk, Philadelphia, gave a talk on "Delineation by the Moving Picture as a Factor in Dental Education," following which several films were shown to illustrate the teaching value of the motion picture in presenting recorded dental operations (see page 90). The presentation was discussed by Drs. T. W. Brophy, A. D. Black, J. H. Kennerly, A. W. Thornton, Thos. L. Gilmer, A. E. Webster, B. Holly Smith, and Dr. W. A. Giffen, Detroit, Mich. Dr. Kirk closing the discussion.

The meeting adjourned, to convene in sectional meetings (see page 106) Wednesday and Thursday forenoons, to visit the Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, and the Philadelphia Dental College, Wednesday afternoon, and to meet Thursday afternoon for regular session.

THURSDAY AFTERNOON.

The meeting was called to order by the President at 2:30 o'clock.

The Secretary read the minutes of the last session, which were approved.

Dr. Ellison Hillyer, Brooklyn, presented Report of Commission on Text-Books (see page 100).

The Secretary called attention to the lavender cross which had been adopted as the official insignia of the dental profession, stating that the badges which had been distributed to the members here were furnished by the King & Eisele Company, Manufacturing Jewelers of 14 North Division street, Buffalo, N. Y., without charge; further announcing that members of the profession desiring badges in future could obtain same, at a nominal price, from the above mentioned company.

Dr. H. W. Morgan, Nashville, moved that a vote of thanks be extended to the King & Eisele Company for their courtesy and kindness in presenting these badges to us. Motion seconded, and unanimously carried.

Dr. A. D. Black presented report of the Executive Board, as follows:

REPORT OF EXECUTIVE BOARD.

The Executive Board has accepted resignations of the Barnes Dental College of St. Louis and the Medico-Chi. of Philadelphia.

The Board has approved the recommendations made by the Commission on Nomenclature for publication of a Dental Dictionary, this to be safeguarded by supervision of the manuscript by the Text-Book Commission of this organization.

The Board has instructed the Secretary of the Institute to present amendments to the Constitution and By-Laws to eliminate reference to standards of National Association of Dental Faculties as applied to membership in this Institute; also to provide for an associate membership which might be extended to institutions giving postgraduate instruction only.

The Board has also instructed the Secretary to notify all film companies engaged in preparation of dental films for teaching purposes that it is the sense of this Institute that names of members of the profession should not be shown on screen in connection with the films.

A request from the Editor of the Journal of the National Dental Association that selected papers of this meeting be published in the Journal was referred to the Secretary with power to act.

The Secretary-Treasurer's books were examined and approved.

(Signed) A. W. THORNTON,
R. W. BUNTING,
ARTHUR D. BLACK.

Dr. A. W. Thornton presented report of committee appointed to draft resolutions upon the death of Dr. C. R. E. Koch (see page 105).

Upon motion, carried, the report of the committee was accepted and the resolutions as read adopted.

Reports of the work done in the scientific sections were then presented by the various chairmen of the Sections. Upon motion, carried, the reports were accepted. (See page 106.)

Dr. C. H. Hebble, Columbus, presented Report of the Master of Exhibits (see page 192), which was approved.

Dr. G. S. Millberry, San Francisco, presented report of the Special Committee on Indexing Dental Literature (see page 194). The report was accepted.

Report of the Secretary-Treasurer on the Dental Index Bureau was presented by the Secretary of the Bureau, Dr. J. O. McCall, Buffalo (see page 197).

A communication from the Preparedness League of American Dentists was read by the Secretary.

Upon a motion, unanimously carried, a vote of thanks was extended to the Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, the Philadelphia Dental College, and the Academy of Stomatology, for the many courtesies extended and the fine entertainment provided, also to the S. S. White Dental Manufacturing Company for furnishing the programs, and to the hotel management for courtesies extended.

Election of officers for the ensuing year then took place as follows:

President, John F. Biddle, Pittsburgh.

Vice-President, A. W. Thornton, Montreal.

Secretary-Treasurer, Abram Hoffman, Buffalo.

Member of Executive Board to fill the vacancy caused by expiration of term of office of Dr. Thornton, Guy S. Millberry, San Francisco, the membership of the Board now standing as follows:

Russell W. Bunting, Ann Arbor, one year.

Arthur D. Black, Chicago, two years.

Guy S. Millberry, San Francisco, three years.

In surrendering the gavel to President Biddle, the retiring President said:

"Before admonishing the President upon his new duties, I would like to say that the gavel, was, through an oversight, not brought to this meeting by its custodian, Dr. Gethro. Therefore in place of our very beautiful gavel I am presenting the candidate with a tack-hammer.

"Dr. Biddle, it is a pleasure to me to hand the gavel over to you. I know of no one who, because of faithful service rendered to the Institute, deserves the honor more than you."

President Biddle responded as follows:

"Dr. Bowles and Fellow-Members: The Secretary has suggested that it shall be expected I can drive things home with this tack-hammer.

"The presidency of this Institute, the recognized teaching body in dental education, is to my mind one of the greatest honors which a dental organization can confer upon a member. We are now entering upon the twenty-fifth year in the history of this organization, and when we celebrate our silver anniversary one year hence, I hope, as I know is the wish of every officer of this Institute, that in the history of the organization the coming year may be recorded as one of exceptional progress in the annals of this organization. To this end I ask the hearty support of every member of the Institute in order that the year's work may be of mutual benefit. I thank you for the honor which you have conferred upon me."

The President (to Vice-President Thornton): "I congratulate you upon the office to which you have been elected."

Dr. Thornton: "There is a saying in some parts of Canada that there is no use sending a boy on a man's errand. In other parts of the country I have heard this paraphrased in different words, namely: That you can't drive a ten-penny nail with a tack-hammer.

But if there is any man in dentistry that can hope to do that with any degree of success it is the gentleman whom you have just elected to the presidency of the Institute."

The minutes of the session were read and approved.

Adjourned.

ABRAM HOFFMAN, Secretary.

ADDRESS OF WELCOME.

DR. EDGAR F. SMITH, PROVOST OF THE UNIVERSITY OF PENNSYLVANIA.

Mr. President, Members of the Institute:

It gives me great pleasure to say a word of greeting to you. I am not a dental man, but I have this in common with you: That I am a teacher, and I am thinking of you this morning as teachers. I have just come from a lecture myself, having had the privilege of speaking as a teacher to about three hundred young men and young women who are beginning their career in the University and who are making their acquaintance with the many subjects that are taught in the University. The subject presented this morning was one that I have no doubt you all at sometime in your career have studied, but which perhaps very few of you have much to do with now, the wonderful science of chemistry. At least my knowledge of dental students would lead me to infer that a great many of the students who are in the academic and professional schools of the University are there for what they think is more important than chemistry. And therefore chemistry is promptly parted with after the examination, the texts are placed on the shelves, and they are not looked into again unless under pressure, unless you want to see what it is that causes trouble or when certain metals misbehave when brought in contact with certain fluids, etc. My experience in this direction leads me to believe that one of our aims as teachers ought to be to have those whom we teach realize that every subject that happens to be in their particular curriculum is of prime importance. I can recall the day when medical students regarded chemistry as a subject that they would gladly transfer to some other department: that is, they were always willing to say, it had no bearing upon their work as medical men. Yet we have lived to a period in which chemistry is regarded as one of the fundamentals. To-day we are requiring for admission to our medical school a knowledge of general chemistry and analytical chemistry, and shortly, within the year, we are going to ask that those who come to us shall have not

only that foundation in chemistry, but an intimate laboratory acquaintance with organic chemistry, so that they can really profit by the instruction they may receive in physiological chemistry.

Dean Kirk of our dental school is a chemist; that was his original profession. He has wandered from the fold, but many times in conversation with me he has impressed upon me the fact that, in his judgment, chemistry is of primary importance for dental students. And he makes it plain to those to whom he is speaking that this wonderful cavity, the mouth, in which all sorts of things are taking place, needs to be studied from the standpoint of the chemist pure and simple.

If that be true, then to me it would seem that in our dental schools we ought to give adequate consideration to this important subject. You cannot, I presume, help but conclude from what I have said about chemistry that I am an enthusiast on the subject, and that is true. I find myself unconsciously saying that this subject of chemistry has contributed more to the comfort, the happiness, and the welfare of mankind, than all other circumstances put together. Of course, that is making a pretty big claim, but nevertheless I fancy that after a while chemistry and a few other minor things will constitute the curriculum in medicine and dentistry.

I always like to face teachers. As I have said, I am not going to look at you as dental men, but as teachers, although your subject is dentistry. We teachers have a great responsibility resting upon us, and I think that we cannot shake off the fact that in order to have peace of mind and comfort, and pass comfortably out of this world to the next, we are bound to discharge our full duty as teachers. Part of that duty consists in making plain to those who come under our instruction that they must get what we give them. We are living in an age when to my mind the tendency is to skim over the surface; we are loath to get down into the depths, to plug away at real difficulties and overcome them. Students—I may be wrong, but I hear so much of it from their lips—students have an idea that the superficial is all they need. They lose sight of the fact that the superficial will not amount to much unless they have a very intimate acquaintance with the fundamentals. Nowadays courses are given in our institutions of one term's length. Educators are advocating not a two-term course in any subject if we can possibly avoid it, but the one-term course. How much can you accomplish in one term? Many of us think that two terms are too short for some of these things which we regard as important, and I believe

it is up to us as teachers to stand for certain definite policies along educational lines.

The Dean of our dental school and his colleagues have shown me from time to time that they are looking forward to extension of the course, that it shall cease to be three years, but shall cover a period of four years, and that following that will come requirements for admission similar to those which we ask to-day of men who are going into medicine.

Now, I am not a medical man and I am not a dental man, but from my acquaintance with men in both those professions, from the work that you have to do and from a thousand and one facts, I cannot but feel that the men who shall become the dentists of the future should be just as well trained as medical men. If the mouth is as important as we are led to believe it is, if the stiff joint perhaps is traceable to some disturbance in the mouth, if the failure of the brain to work properly is traceable to some disturbance in the joints, then isn't it but fair to assume that the broader, more thorough preparation of the men who make that particular cavity their favorite study will better equip them for their life work? I believe in broad training for every one, I believe that the man who breaks stones on the pike will break them better if he has had some sort of preliminary training to give him an idea of the character of the material upon which he is working, something of the manner of cleavage in rocks, etc. You know our German brethern tell us that our failures are largely due to the fact that we are content with what I spoke of a moment ago—the superficial; they tell us to our faces that oberflaechlich, skimming of the surface, seems to be enough for us. The Germans are gruendlich, and we have evidence to-day of what that tendency will do. They have dug down so deeply that it is hard to get them out of the places to which they have gone. And so it is with their scientific work; it is natural for them to bore down to the bottom and to find out everything that is to be discovered there.

Well, I don't think that you are here for a lecture from me. You have come together to compare notes, to hear the things that will be helpful to you at your different posts, and I have come down simply to meet you as a fellow teacher. We want to see you out at the University, we want you to learn to know us, and we want to know you.

And now, Mr. President, on behalf of the University and on behalf of the members of the dental faculty, and of the great student

body in the Evans Institute, I extend to you a most cordial invitation, not only to-morrow at luncheon, but any time during your stay in Philadelphia.

RESPONSE TO THE ADDRESS OF WELCOME.

DR. F. B. MOOREHEAD, CHICAGO.

Mr. President, Provost Smith, Members of the Institute:

The Provost said he wanted to come over and get acquainted with us. As I looked at Provost Smith while he was speaking, I came to the conclusion that it would not be a difficult thing to get acquainted with him. It is easy to get acquainted with some people, and easy to like some people, and I think it would be very easy to get acquainted with, and come to like, the Provost.

I was very much impressed with the manner in which the Provost greeted this body of men. He greeted us, not as dentists, but as fellow-teachers. If that thought can run throughout this entire meeting, it will do us all a great deal of good. We are, in the best sense, teachers first and dentists second. The work that you and I do as teachers is a part of the world's work, and dentistry is simply an item in social progress.

The thing for which we strive first is citizenship; the thing for which the University stands, Provost Smith, is citizenship. In its ultimate analysis, society is striving for a better type of citizenship. Whether a man take up dentistry, law, medicine or theology, he is merely in that particular choice, preparing himself to render specific service to society; he is preparing himself to make a contribution as a citizen.

In our work as medical specialists, we are training men to help make men better physically, and through making a better physical man, indirectly make a better intellectual and spiritual man.

Properly viewed, therefore, we are certainly teachers first and dentists second. The thing that is apt to cripple us, that frequently cripples our meetings, is the fact that we become routinists. We are apt to become circumscribed with a small idea, and forget the world of big things with which we ought to come into intimate contact. Many a man spends his time digging in a "blind ally" year after year, forgetting that the sun is shining, and that there is a wonderful world all about him. Such a man is not apt to make the human race better.

The Provost's splendid word of greeting might well be taken as a text for this meeting, and if his thought may run throughout all of our sessions, it will be one of the best meetings in the history of the organization.

Fundamentally we are men and citizens, and have chosen dentistry as the means of expressing our usefulness to society. Dentistry is not an end in itself, but a means to an end. The right kind of dentistry will materially aid in the development of a more perfect type of man. We are, therefore, very grateful to the Provost for setting a fine perspective for this meeting, and we want to thank him for his very fine word of welcome and greeting, and to assure him that we shall be glad to accept his invitation to visit the University.

PRESIDENT'S ADDRESS—POSTGRADUATE TEACHING.

DR. SHIRLEY W. BOWLES, WASHINGTON, D. C.

Pursuant with the dictates of the constitution and by-laws of this Institute your President will make his annual report. He has selected Graduate Instruction as the burden of what he will report for your consideration. He will also venture opinions as to the causes leading up to the necessity for graduate instruction and the part that this Institute should play in this important field. The program for this meeting has been arranged to specifically and comprehensively cover the four year undergraduate curriculum; so that it seems a propitious time to touch upon graduate teaching.

Because of the growing recognition by the public, which the dentist serves, of the reciprocal relations of the oral cavity to other parts of the body, and because the medical profession is more and more calling upon the dental practitioner to heal mouth-conditions which are jeopardizing the health of his patient, the demands for highly skilled and intelligent dental services are increasing daily. To meet these increasing demands upon their output the colleges of the country have gradually broadened their courses. The last step taken in this direction was going to the four year course.

We all can see that one of the most potent factors, one of the strongest influences in this uplift and broadening of dental education is this Institute.

As a result of the broadening of the courses the graduates of a few years ago, and back of that, are in great need of postgraduate teaching. They need more general knowledge of that part of dental

science which has developed since they left college. And they want special training to fit them for practicing specialties. The colleges have not heretofore met this need and there has sprung up outside of the colleges various forms of so-called postgraduate teaching. There are special independent schools where crown and bridge work is taught as an art, and where local anesthesia, gas and oxygen anesthesia and analgesia, and some root canal technic are taught. There have been courses for the practitioner given by itinerant teachers, good, bad and indifferent. Of these itinerant teachers there is one class that cannot be too severely denounced and condemned; i. e., the commercial itinerant teachers. They place themselves in this class when they answer "Yes" to the question, "Have you anything to sell?" Included in this class are those who have instruments, apparatus, and methods or processes which cannot be obtained without paying for and taking the postgraduate course proffered exclusively by these men at so much per; always including the instruments, apparatus, etc. Their announcements are very inticing, promising to double and treble the income with half the effort heretofore given. The pupils have been lulled to sleep by the get-rich-over-night dream, only to awaken to the sad realization that they have received nothing but so much goods for so much pay. Dr. Samuels in his paper before the Panama-Pacific Dental Congress says, "It would appear that the primary object for offering many commercialized postgraduate courses is exploitation, not education."

We see then that the special schools do not offer courses broad enough to entirely meet the educational requirements of postgraduate instruction. And that the commercial teachers do not educate.

The members of this Institute have been alive to the problem of Graduate Instruction. A canvas has been made to obtain the extent to which their activities have gone. There are thirteen schools doing postgraduate work in some of the following forms:

1st. A course given within the school by members of the faculty.

2nd. By so-called extension courses where men from outside the faculty give special courses on special subjects.

3d. A combination of the two, where the teaching of the faculty is augmented by imported talent.

4th. By allowing the alumni to attend the regular session

of the senior class and work in the infirmary and laboratories to gain, if possible, whatever knowledge they are seeking.

Five colleges are about to go into new buildings and each has definite plans for carrying out graduate teaching. These are College of Dentistry, University of Iowa; Dental Department, Washington University; School of Dentistry, University of Pittsburgh; College of Dentistry, Tulane University, and New York College of Dental and Oral Surgery. School of Dentistry, University of Pennsylvania, also has definite plans for a postgraduate course, which they expect to put into effect in the near future.

Thus nineteen, not fifty per cent, of our members are actively engaged or contemplating engaging in this part of dental education.

The deans were asked to express opinions as to which method of postgraduate instruction they believed the more efficient. Nineteen voted for courses given within the schools by the faculty and eight for the extension courses. Some voted for both, to meet the conditions in their sphere of influence, and others did not vote.

The deans were also asked to express their opinions as to the kind of supervision postgraduate schools should have. The larger number declared unequivocally for University connection, providing of course, it was bona fide and not used as a cloak to cover up the weaknesses in the faculty or equipment. The smaller number feel that in the absence of university connections postgraduate schools should be sanctioned by some recognized educational body, such as this Institute.

Of the colleges doing postgraduate work, the Northwestern Dental School has announced what is probably the broadest schedule yet attempted. They will receive for a four-weeks' course a limited number whose membership in local or State Dental Society is necessary to registration. The subjects taught are Oral Surgery and Anesthesia, Dental Pathology and Treatment—Prophylaxis, Operative Dentistry, Crown, Bridge and Denture Construction—Anatomical Occlusion, Orthodontia, Dental Histology, and Radiography. The schedule fills the hours from eight A. M. to five P. M. and consists of two hours of lectures and six hours of clinic and demonstrations in the various departments each day. The clinics and demonstrations will be given in the infirmary and laboratories of the school. In addition to above, special lectures will occur in the evenings including Mouth Infections, Comparative Dental Anatomy, Cases in Practice, Dental Bookkeeping, and Practice Building.

These courses are given by the heads of the departments of the school, their associates and assistants.

The Philadelphia Dental College has had postgraduate courses for many years past. They are given during the regular college session by college instructors and in a specially equipped laboratory separate from the other students' quarters.

The New York College of Dentistry has just inaugurated courses in Orthodontia, giving one evening each week from December to May to practical work and one evening to lectures. This school has courses in Removable Bridge Work, Inlay and Crown Work.

The following named schools are offering advanced work to practitioners by allowing graduates to come into the school and do the general work of the senior year or any part they may elect; University of Michigan, University of Minnesota, Vanderbilt University, Harvard University, and the Western Dental College, of Kansas City. In addition the University of Michigan has offered work leading to the degree of Doctor of Dental Science, which has been opened only to those who have made marked records at Michigan, as students, and shown decided inclinations and ability to pursue research work, and also to graduates of other schools who have demonstrated their ability to pursue research work through dental literature. They have always required at least one year of resident work, but do not grant the degree, in many cases, on less than two or three years work, depending upon the number of subjects the applicant needs to pursue to broaden him along lines in which he is doing research.

The alumni of the Western Dental College, Kansas City, is organized for postgraduate work, one section of twenty being known as the Black Study Club. Their plan is to engage the best talent available three times a year, holding classes for a week or ten days.

The School of Dentistry, Marquette University, encourages and exercises a supervisory function over extension courses given at monthly meetings by the County Society and at the Annual Meetings of their Alumni Association.

The Dental Department of the University of California has for three years been giving extension courses of lectures annually comprising a series of five lectures and clinics or demonstrations on subjects that are, at the time, commanding the attention of the dental profession. The lectures and reports of the clinics of these courses are printed and distributed among the dental profession, including those who took the course.

The Royal College of Dental Surgeons, Toronto, has conducted two or three postgraduate courses during the past fifteen years. At present the school is giving a course in Modern Dental Prothesis covering the following subjects: Removable Bridge Pieces, Modern Impression Making, Anatomical Articulation, Scientific Manipulation of Plaster and Vulcanite, including practical tests, Esthetics, and Economics.

The Dental Department, Medical College of Virginia, gives a course taught by its own professors and others outside the school. The course consists of the following subjects, Prosthetic Dentistry, Operative Technics, Conductive Anesthesia, and covers a period of two weeks.

This, then, is a resume of what the members of this Institute are doing in graduate teaching.

We believe that Dr. A. D. Black spoke the truth when he said that "The dental profession cannot successfully handle the problems now confronting it with the present type of dentist. We must develop both in our schools and from among ourselves a new type."

Postgraduate work must play an important part in developing this new type of dentist. It is evident, too, that no one form of postgraduate instruction will meet the demands made upon the different schools. Some can give courses within their own faculty. These are the schools where the strongest men are full time men, or at least give the major part of their time to teaching. Other schools must call upon teachers outside their faculties.

It is believed that the best results can be obtained in schools where the course can be given by members of its own faculty; and where the didactic work, and practical work if possible can be separated from the under-graduate work.

It is the opinion of your essayist; that to solve this problem which confronts dental educators as broad and comprehensive a course should be offered as possible.

It is believed the course should extend over a period of three months. That the basic subjects, such as Dental Pathology, Dental Histology, and Bacteriology be made compulsory upon all taking the course; that the practical branches be made elective. This plan seems indicated because of the fact that the big majority of the men seeking this work are desirous of specializing along certain lines of practice. By this scheme it is assured that there is a good grounding in the fundamental subjects. It will also allow more

time for the practical part pertaining to the special lines along which development is desired. The time taken from the practical work not bearing directly upon the specialty could be given over to those subjects which are collateral to the specialty. Such a course to practitioners will surely develop a new type of dentist from among ourselves as will the four year course in our schools.

There are few schools that can now give such full courses. In view of this fact, and until such time as all can, it is suggested that members of this Institute could be arranged in regional groups. Those members of the faculties of the schools composing the group, who have shown special fitness for teaching certain subjects, would be selected to give the Graduate Course. The course would be conducted at the school where the equipment and facilities are equal to the demands of the course or could be made so.

It is believed that this Institute would be fulfilling part of its object if it assumed some form of active supervision over graduate instruction. It is recommended that a commission be appointed to keep in touch with all courses of this kind and report annually to the Institute, with recommendations for raising the standards of this phase of dental education. It shall also be a duty of the commission to recommend steps that can be taken to materially discourage postgraduate instruction which does not meet all demands for same. It is finally recommended that the Executive Board determine if the activities of such a commission would be within the scope of the functions of this Institute.

Your presiding officer must here express his great appreciation of the honor you have conferred upon him when you made him President of the American Institute of Dental Teachers. He considers it one of the greatest honors in the gift of the dental profession. He has read in recent presidents' addresses so many beautiful and eloquent tributes to this body that he cannot now attempt another. Those who have taken an active part in its affairs realize that in no other dental organization are men so earnest, unselfish, and enthusiastic. It is such attributes as these and the heritage of the great men who have gone on, that make this essentially the greatest of dental organizations.

In conclusion, your President wishes personally to thank the officers and committees who have worked so loyally and efficiently to make this program of material benefit to the members of this Institute.

DISCUSSION.

Dr. G. S. Millberry, San Francisco

Our President has given us in his address a very general review of the various methods by means of which practising dentists are or may be given the opportunity to learn of the progress being made in special fields of endeavor, from those among us who are continuously studying and teaching, all of which he has grouped under the general heading, "Graduate Instruction."

Other than the demands of a better educated public and the medical profession for better dentistry as causal influences, I believe there is a very earnest desire on the part of the more progressive element in the dental profession to be well informed in their work. Victor C. Vaughan, in an address to the medical students at the University of Michigan a few months ago, said: "To enter upon the practice of medicine without adequate preparation, or to continue in it without adequate preparation, is a moral if not a statutory crime." It is the duty of the institutions who gave these men their professional training to continue to give them the opportunity to return for further adequate preparation, if they are to fulfill their obligation to society.

Postgraduate instruction in any institution, as we ordinarily comprehend it, is based upon something more than those general plans that are included in the President's address, inasmuch as graduate instruction in the university is usually builded upon a primary degree, the Bachelor's, and leads to an additional degree beyond that, a Master's or ultimately Doctor's degree. And it seems to me that in a general consideration of this plan, all the courses of graduate instruction, or so-called graduate instruction, do not take into account the general scheme of work as offered by the universities throughout this country. And it also seems to me, that in undertaking the work through this Institute, we must have a very much larger grasp of our responsibilities in offering to the practitioner of dentistry the postgraduate training than is at present given under the so-called courses of graduate instruction. If we are to give real graduate instruction, it would seem to me more appropriate for us to look forward to the time when we can give instruction of such a character and under such conditions as will fully justify the designation "Graduate Instruction," and perhaps warrant the granting of a suitable degree.

After a careful review of the work being done in the Forsyth Dental Infirmary, in which a one-year course is given in Orthodontia

including clinical work under the most favorable facilities, plus a full fifteen hours of didactic instruction each week, it seems to me that is the type of teaching we should look forward to as our goal in offering graduate instruction to those men who desire it.

The itinerant methods of instruction, to which President Bowles referred, is fulfilling a demand in regard to those branches of work in which the practitioner desires to become a little more proficient. Such instruction harks back to a very early period in dentistry, with which probably most of you are much more familiar than I am, when "to get," rather than "to give," was the motto in dentistry; when every dentist received his education and knowledge by paying these itinerant instructors for some clinical demonstration or for the right to use a certain therapeutic agent exclusively. And in almost all instances, under those conditions the practitioner was inhibited from giving this information to any other dentist. That form of itinerant instruction prevails to a large degree today and must be discountenanced by this Institute if we are to stand for sound educational principles.

Referring again to the causal influences, mentioned by the President, which induce men to seek to become familiar with advanced methods of practice; after studying this problem as we have done in the West, it seems to me that there is a still further reason why graduate instruction is demanded, and that is the desire on the part of the leading, progressive dentist to make himself familiar with better dentistry. He wants to keep in the line of progress, and he comes back to grasp every opportunity that offers, in order that he may become a better dentist. And we ought not to lose sight of that type of man because he usually exerts a good influence in the profession.

With reference to the various types of graduate instruction offered, as mentioned by the President, in the far West we have found that a course of extension work, as we call it, supplies a very great need and is one of the most satisfactory methods of meeting the requirements of this type of dentist; in fact, these courses have proven to be very successful in every sense of the word. In reaching out for the type of men who would give this instruction, we have always gone to the teacher, because invariably we have found that teachers are usually the men best able to present the various subjects in which we desire to give instruction, and we generally try to satisfy the demands of the profession in giving that type of instruction. Further, as a rule we try to select a subject which is foremost in the minds of the practitioners at the

time the instruction is offered, and we endeavor to give it in such a concentrated form that they can grasp all there is in a review of the recent advances made in that particular field of endeavor, presented by those men who are constantly studying their special work. Prominent teachers from any part of the world are willing to make personal sacrifices for the cause of better dentistry when the request to do so comes from a dental school of good standing: and when such institutions supply only the very best dependable instruction in the subject which the professor is particularly interested in, a confidence is established which has a very good influence on dental practice.

In the journal "Science," of November, 1916, is published a report which was presented to the British Association for the Advancement of Science by one of its committees which had sent to all the scientific associations in England a questionaire as to the results of popular science lectures, which have been given in England for a period of about thirty years. And since that report very closely correlates the work carried on in the West during the last four years, it probably would be worth while to summarize here the results as revealed by that report.

In the first instance those lectures, usually given under the auspices of some scientific society or institution, have as a rule been given without profit; in fact, there generally has been a deficit. Those lecture courses were organized to satisfy a popular demand for more scientific knowledge along given lines, and that has been our experience. The courses which we have given have not been conducted with the idea of profit, but simply to make them self-supporting and to satisfy the needs of the dental practitioner.

In the second place, we found that the celebrity, the man best known in his field of endeavor, proved to be the most popular lecturer in any city. And so it has been in England. As the result of thirty years' experience it has been recommended that these courses of instruction be offered by the faculties in institutions within certain groups. But we have found that the old adage "The prophet is not without honor save in his own country," is the one thing which renders in very large degree such courses of instruction unsatisfactory. It does not make very much difference who the lecturer is if he comes from "out the East," if we may use this term in symbolic sense; he seems to satisfy the demand much better than the man who comes from the same territory and is well known to the people in that district. We feel

that the same condition would prevail with regard to some of our western men in other sections of the country, because the states of California and Washington possess within their borders instructors who are competent to give you men in the East some ideas about dentistry that perhaps you may not be familiar with.

Also we found that the most satisfactory method of presenting these courses of instruction was by means of a novel idea in illustration. It has been proven in England that the cinematograph and various other forms of giving this type of scientific knowledge, have practically replaced popular science lectures. And the man who comes to a dental meeting without some novel means of presenting his work, does not attract attention. No matter what character of novelty may be employed in the presentation of this scientific work, some means must be devised whereby it will reach the people. Clinics invariably attract, and the man who is an excellent clinician will always meet the demand.

As the result of our first call for a teacher to present the proposed extension course of instruction, some four years ago Dr. Chas. K. Teter of Cleveland, Ohio, gave us both didactic and clinical instruction in nitrous oxid and oxygen anesthesia and analgesia. We had included in that class 210 members of the dental profession coming to San Francisco from within a radius of over 500 miles to take the course. Whenever any class has been very large we have divided it into sections for the clinical work.

The second lecturer who appeared before us was Professor Immanuel Otteson of the Tandlaege Institute, Christiania, Norway, who fulfilled a similar mission at the University of Minnesota, and also visited the University of Southern California, Los Angeles, and Seattle, the latter under the direction of the University of Washington. And Professor Otteson satisfied a great demand in teaching local anesthesia in minor surgery and operative dentistry.

Last year we had a course of instruction on diseases of the investing tissues of the teeth, by Dr. Arthur D. Black of Chicago, who visited the four principal coast cities.

This year Dr. F. B. Noyes, Chicago (University of Illinois), is giving us a very good course on dental histology and orthodontia with the idea of acquainting the profession in our section with some of the basic, fundamental researches that have been made in regard to the tissues with which we are dealing, to the end that we may

comprehend more satisfactorily and thoroughly the questions involved. In our next course of instruction we hope to offer a general resume of the problem of focal infections and root-canal work. We have found that the profession generally is quite panicky in regard to this problem, and we realize that the men who have delved deeply into these problems are the ones that are going to offer this course to us in a most satisfactory way.

Such instruction in the various branches of dentistry is of the greatest value to the busy progressive practitioner, and should be given in a dependable way in definite periodic sequence and under the direction of a single institution. I doubt whether the Institute can do more than act in an advisory way, and if left to a committee of three it means that such a group would be likely to dictate the conditions under which such instruction should be given, without a full knowledge of the needs of the several districts or regions.

As to the advisability of establishing regional groups which shall include several schools or their faculties, with the idea of presenting instruction in the institution which offers the best facilities, I cannot concur in the recommendation of the President. It seems to me that this plan is impractical for the very reason that the courses of graduate instruction should be based upon standards, and when we find that in some parts of the country certain institutions, which would naturally fall within such regional grouping, are lending themselves to the exploitation of certain itinerant instructors for the purpose of making money, you cannot, as an Institute, consistently ask other schools in those regions to group themselves with such institutions in order to offer to the profession these courses of graduate instruction.

The President has given us in this Address a great deal of food for thought. It seems to me that these problems must be largely worked out by the various institutions themselves, rather than by groups of institutions, because each school is a separate unit in the district which it occupies, and those institutions which are subservient to state regulations and state laws cannot under existing conditions be combined with other institutions and be regulated by a foreign influence. This Institute has a wonderful opportunity in the matter of advising and directing these affairs, but when it comes to regulating them through any certain committee which would dictate the policy of any school or group of schools as to how this graduate instruction should be given, I cannot concur with the President's recommendations in that regard.

I am happy to have had the opportunity of listening to this Address. The subject is, I believe, worthy of the utmost consideration on the part of this Institute, for the President has opened the way for a better understanding of the needs of the graduate and has given us many valuable suggestions as to our obligations in this matter.

Dr. T. W. Brophy, Chicago

Unfortunately, copy of the Address of the President failed to reach me before I left home several days ago, but I have listened very closely to the presentation of his subject, and, while it has been fully discussed by Dr. Millberry, I shall take up but two or possibly three phases of it and then make way for those who are to follow.

The President has spoken of the work of men who are traveling over the country giving instruction in certain departments of practical dentistry—of their ability, of their responsibility, and of the effectiveness of their work. Personally I have had no opportunity to look into their activities in this direction, but from what I have been told I am satisfied that a great deal has been done that would better not have been done. I am told that men are receiving from parties of that kind instructions that are detrimental rather than otherwise. From information gained, I am of the opinion that in some instances the work of these men is purely commercial; that they are selling things and giving instruction in their use. I am satisfied that many men are devoting their time in part to this kind of work with the very highest motives, but am of the opinion that the President is right when he says that instructors who are so engaged should have either the endorsement or the disapproval of this Institute. Certain itinerant teachers are a good deal like itinerant practitioners: They teach as long as their pupils are willing to pay, and when the time arrives that they do not longer receive pay for their services they discontinue teaching.

The question of the extension course was considered, which I think is perhaps of the greatest importance. Some few years ago President Elliot of Harvard University visited the universities of various western states, and while in Madison, Wis., he made the statement that he had supposed Harvard University to be one giving to its students everything in the way of instruction, but that he had not measured fully the question of the usefulness of a university until he reached Madison. There he found that the University of Wisconsin was extending its influence to every school district in the state; that the Department of Agriculture included an exten-

sion course, and that teachers visited farming communities and gave instruction in all the departments of agriculture, and that they carried seeds to the different parts of the state so that farmers might have better seed from which to grow their grain; consideration of the question of dairy husbandry was taken up in every section. President Elliot stated that he believed the state of Wisconsin was doing more for its inhabitants than was being done by any other state in the union.

And so, while President Bowles was reading his Address I thought of that, and then I thought of the function of this Institute: Are we here for the purpose of doing work in the future? Are we here for the purpose of preparing young men and women to serve their patients in the years to come? May we not, through extension courses carried on by members of this Institute and others designated by the Institute, carry the influence of this body to every practitioner in every state in the union, so that members of the profession who desire to do so may improve themselves and do better service for their patients than would be possible for them to do otherwise? We cannot afford to say that we are preparing for a service in the years to come; let it be *now*. If we act upon the suggestion of the President that extension courses be conducted, I am satisfied that you may go out in little associations and societies in different parts of your respective states and carry instruction to those men who will eagerly receive it, and which will enable them to render to their patients better services than they would be able to do without it.

There is too much in the President's Address for me to gather up and discuss in detail. I am very glad to be here today and to have had the pleasure of listening to this address, which is one that is of real practical value to the profession and to the teaching bodies, and its vital points should be studied and worked out and put into operation.

I feel certain that this will be a great meeting. It seems to me that every meeting is a greater meeting than the last. And so long as that can be kept up, this Institute will grow and grow and will become a tremendous power in improving the status of the dental profession in our country.

Dr. Arthur D. Black, Chicago

President Bowles has given us a very fair and interesting statement of the status of graduate dental teaching in this country today. He has brought for our consideration the problem of the extension of the function of the dental

school. Heretofore it has generally been considered that the dental school has performed its function if it has trained as best it could those students who have entered its doors and remained during the period of its course. In the progress of the profession we have expected the dental society, the dental journal and the published book, to carry each individual throughout his practice after he has left the school. The question now arises as to the part which the school should play in that future education.

This question has arisen, in part at least, because we see a partial failure of the other methods. The dental society and the dental journal and our books, have not, it seems to me, served the purpose they ought to serve. I am not necessarily blaming the dental society, the dental journal, and the books, because there is a thing behind all of this which accounts for most of this failure, and that is the prejudice existing among the practitioners of dentistry toward the very things that they most need. We all know that one of the greatest difficulties we have in our schools today—the difficulty which was mentioned by the Provost—is that of interesting students in fundamentals. That difficulty exists today largely because of the prejudice of the men practicing dentistry today, which prejudice they have inculcated in the minds of young men before they come to us. And that is the thing which is holding the dental profession back at the present time more than any other thing. The dental school which looks toward this proposition and contemplates taking an active part in it, needs to understand that it is taking upon itself a task of self-sacrifice; that certainly for some years to come no great amount of glory will come to the men who take up this problem seriously, because we must fight and break down this element of prejudice before we get much of a start.

There are several problems involved in this whole matter of graduate teaching. We have the problem of the man who wishes to specialize in some particular line. Another is the problem of bringing the general profession up to date, if I might use that expression. For the man who wishes to specialize in some particular line, the course of Orthodontia, for example, is one which should occupy not less than a year and preferably more. Such courses can doubtless be arranged with little difficulty. The much greater problem of interesting a fair percentage of the entire profession presents no possibility of solution at the present time.

There is no better illustration of the need of graduate teaching than the problem of focal infection. The dental profession as a

whole has found itself so handicapped in considering and understanding the situation that it has almost thrown up its hands. It has not the foundation to understand the situation which is before it today, and it will require the cooperative effort of all of our schools and the individual members of faculties to make much progress.

In Northwestern we have for some years past given post-graduate courses during the month of June. We have never been satisfied with these courses. Personally I have tried to analyze the men who have registered, and arrive, as best I might, at the reasons why they have come to us. We might possibly divide them into three groups:

First, those who come for a beautifully embellished certificate, and they are a considerable percentage. Consequently we have ceased to embellish our certificates. In fact, the certificate which we now give consists of a simple statement that the man was in attendance at this course for four weeks. We had one case in particular to which I might refer: A gentleman made the journey from South America to take this single four weeks' course, and then tried to palm off that four weeks' course certificate as a full three years' certificate of graduation from our school. I do not doubt there are many foreigners who come with that idea, and there are many Americans who also come for the certificate rather than the course. This is one feature we have to take into account, and we must cut off as many men of that type as possible.

Second, those who are willing to sit and have you pour into them as much information as possible, without using their own minds a particle, or who sit and watch the demonstrations without even being willing to use their own fingers to amount to anything. They seem to desire more than anything else next to the certificate, to be able to go home and say they have taken this course somewhere.

Third, those who come to take these courses because they really want to get at the thing and do all they can for themselves. The majority are willing to sit and listen and say it is "fine," but they are not willing to study the books which treat of these subjects. It seems to me that we ought to consider the development of graduate teaching along those lines which will be most likely to induce a man to do a little studying on his own account. In this we have a most difficult and serious problem before us; its solution will come only through a very slow process of evolution.

Dr. Millberry emphasized the fact that these types of graduate

courses were not the ideal courses which men should take; that the graduate courses offered should be those which represent a definite amount of study which would lead to the conferring of a speical degree. As applied to the profession generally, or to any considerable number of men in the profession, such a plan seems to be impractical at the present time. For the man who is going to specialize along a particular line, it is, I believe, thoroughly practical. I am endeavoring to look at this larger problem of our being able to interest the members of the profession generally in their own advancement. Are we to permit the graduate to feel that his dental education is complete—that he does not need to study more —that he can "get away with it" and make a living with that much knowledge? Or are we going to try to inspire the men who attend dental school to be men of a different type when they go out? I am sure we are all doing the latter, and I believe we are meeting with considerable success and that eventually the situation will take care of itself. But *eventually* is a good way off, and we must consider what we may do today or tomorrow, and for the next twenty to twenty-five years, to encourage those men who are already out in practice to do more of studying and thinking on their own account.

It seems to me, therefore, that in the plans which we lay, no matter what form these may take, for postgraduate teaching, we should not confine the work which we present too much to those things which will be simply attractive to the men who come. I would rather have twenty-five men interested in lectures on histology, than to have a thousand take courses in which the so-called practical technical problems are discussed. A course which emphasizes details of mechanical procedure, all of which are well enough, will attract the crowd, but the course which requires some study of fundamentals will be very unattractive.

Therefore in the course offered at Northwestern we have tried to mix these two things up as much as we could, and we are requiring a grade of seventy-five per cent in attendance for all lectures and demonstration. We have tried to mix those two types of instruction up in such a way that it will be rather inconvenient to take the one type and not the other. One of our practitioners in Chicago brought this point up the other day, saying: "I would like to come down and take this course, getting the demonstrations in removable bridge-work," and in one or two other things mentioned; "but," he said, "they are all so mixed up in arrangement of time in the course that I cannot take those without too much interference with my practice, so I might just as well take all of them." He very nicely

expressed the thought we had in mind in the arrangement of these courses.

I think it would be very desirable to have a commission which would study this problem and report on it. The work of such a commission should be that of reporting and advising—that, I believe, is the limit to which it should go. We would be entering upon dangerous ground if this body should attempt to place its stamp of approval or disapproval upon certain men or certain groups of men.

I do not want to sit down without emphasizing Dr. Bowles' disapproval of the commercial man or of the commercial dentist who has taken a considerable part in this type of teaching. I believe that all of us can learn some things from the representative of the dental manufacturer, who is not himself a dentist; there is no question but we can learn some things from the dentist who is also a commerical man, but in the very nature of things, there is likely to be too much of commercial flavor in the presentations of both. The most contemptible thing that we have in the dental profession today is the dentist, society member, who is exploiting commercial propositions under the guise and cloak of his society membership. We ought to have no room for such a man in the dental profession, and I think we have all looked too lightly upon, and the men of the dental schools have not discouraged as they should have done, this type of man, because he has in the last few years played no little part in dental matters.

In President Bowles' Address are presented problems which we ought to consider carefully. Whether or not we are giving or attempting to give any type of graduate instruction, we have the opportunity to do good, to influence the attitude of the profession toward all of these things. And as we do influence men in practice toward the greater necessity for the fundamentals, this will be reflected in the young men who come to us in our schools and will make our problem in the handling of those young men an easier one. Therefore I bespeak for this Address your very careful thought to the end that we may in some way do at least a little part towards the furthering of these ideas and to the general advancement of the profession.

Dr. H. L. Wheeler, New York City

I regret that I did not receive the President's most excellent and useful Address in time to permit me to study it as I should have liked to do. However, it is so pregnant with ideas and suggestions that in a very short time I found myself able

to correlate sufficient ideas upon the subject presented to interest me and to induce me to feel that possibly I might make some remarks upon it which would be of interest to you.

There is one phase of this question of postgraduate teaching that I have not heard touched upon except slightly by Dr. Black; that is, the question of the fitness of the student as well as of the teacher. A man takes a postgraduate course for a reason, and unfortunately, as has been brought out here, that reason ofttimes is exploitation, a desire for acquisition rather than a desire for service. And, of course, the man in whom that is the motive, or in whom that motive forms a very large part of the desire to take a postgraduate course, is usually a menace to the profession, to the colleges, to the postgraduate schools, and to the public. But we can afford to wait on patiently, because the public, though slow, sooner or later finds such men out; and, after all, it is by the acts of a man that he finally becomes known.

I have not had any great amount of sympathy with the modern fad which has taken hold of dentistry as well as of other professions, of depending upon the public press for education. The professional journal in any profession, by which I mean the journal that reports the scientific doings and discoveries of that profession, as a vehicle of education is as far ahead of the public press as the organized university is ahead of the itinerant patent medicine vendor. And I do not agree that the journal of a profession can give that profession an education; it can only place before it information. Therefore you must have colleges, and in the course of time a man is forced, whether he wills or no, by a knowledge gained from experience, to see that what was taught him in the college is not all there is to know upon a given subject. And if he is a man who desires to be of service, if you please to himself, or to the profession or to the public, he necessarily wishes to increase his education. For this reason opportunities for postgraduate study are bound to be in demand. And it is necessary that there shall be some system, form, or opinion of a profession which shall have sufficient influence to minimize commercial and acquisitive postgraduate instruction, and shall support and assist that which is given for service.

This brings us to another point: The man that is capable of giving postgraduate instruction must be of an age and experience which will have enabled him to give out knowledge and information of a more advanced grade or of greater value for service, than he has obtained in the under-graduate school or wherever he has

obtained his fundamental education. In view of this fact, it is if possible well and wise to have some way by which the profession may know as a whole, or may have access to such information as will assist them in discriminating between the undesirable and the desirable. Therefore this Institute, dental societies, universities, dental colleges, all of them, if they keep themselves posted, if they are broad-minded, if they have the genuine desire to advance the standards of the profession, should be, and I believe in the majority of cases are, useful along this line. But on the other hand there are many instances in which organized institutions have attempted to establish or put their stamp of approval upon postgraduate courses of instruction. I have in mind a certain large, sucessful and influential dental society not more than one thousand miles from this city and less than one thousand miles from New York, which established postgraduate courses. Now, amongst the good things that have occurred, and there were many such, was one thing which proved not so beneficial. Formerly they gave certificates to their students, and in less time than it takes to tell it they became aware that illegal practitioners were finding their way into the classes because they paid a fee, the men in charge were not careful as they should have been to discriminate between those who applied for the course, and when the public prosecutor and a detective went around on a tour of investigation those certificates were found hung up in the offices of men who had never taken the degree of D. D. S., but nevertheless setting forth that they were competent to practice dentistry.

Also at the present time, due to certain radical gentlemen whom none of us would say were insincere, whom none of us would say were entirely ignorant, but whom most of us would say were lacking in judgment and discretion, there have been established certain courses which have been endorsed by and are given in dental societies for the purpose of teaching the very radical ideas of those men, the underlying principles of which may be correct, and which the activities of these men in delving into science have been mostly for the purpose of proving are correct. And as a result of this teaching we have pending in New York City thirty malpractice suits, largely amongst well-intentioned young men who have gone out and attempted to follow these very radical teachings. Of course, the thing we wish to do, and I am sure the thing Dr. Bowles desires to impress upon us, is to give postgraduate teaching and avoid endorsing this sort of thing. And I give this example to show that merely your organized body of teachers, of faculties' association, of dental societies, will not give you the necessary knowledge nor the

necessary authority nor the necessary power to discriminate properly at all times, and you may unwittingly and unknowingly (and those cases I have mentioned have, I believe, been done unwittingly and unintentionally), do as much damage as you do good. Therefore you must depend upon that greater force, which unfortunately we have not as yet learned to use as well as we may—the force of intelligent opinion based not upon authority, but upon the desire of the average man with a healthy intellect to at least merit self-respect and the endorsement of his colleagues. To do that, the dental profession must rise to a point where, regardless of its personal feelings and affections, it will not hesitate to condemn, not unqualifiedly, but qualifiedly, new and unproven things, until the careful, conservative, intelligent man has had a chance to try them out and put upon them his endorsement, an endorsement made possible by lapse of time and practical clinical experience.

I quite agree with Professor Black that there is a line of demarcation between the possible value of the technical and mechanical postgraduate courses, and courses made up of the fundamentals. And there again it would be well for this association and other associations to throw the force of their influence, so far as they could do so legitimately, toward making it necessary for a man, before he may be permitted to take postgraduate courses in technical and mechanical work, to know the fundamentals, because a good working knowledge of anatomy, histology, physiology, bacteriology, and pathology, is essential for the student in order that he may determine whether the very beautiful work the technic of which he is learning is going to do his patient more damage than good or more good than evil. And we all know—we have seen it in years past, we will see it in years to come—that much of the most beautiful technical work that dentists do may after all, in the knowledge that time and experience bring, prove to be questionable as to a benefit to the patient's health and welfare. Therefore if it is possible through the influence of opinion to force our students to have a reasonable knowledge of fundamentals, you have made a great step in advance. You would as soon think of sending your son, if he wished to study theology, to Billy Sunday for his theological education, as you would think of sending him some place to secure a knowledge of mechanical dentistry without knowing these fundamentals, and then expect him to practice dentistry intelligently and usefully.

In closing I would submit, as a mere suggestion, the proposition that two measures be urged and worked out, possibly by a commission as suggested by Dr. Black, as follows:

First, the establishment of an information bureau in an organization like this, which shall as far as possible and within the limits of good taste and discretion, give to those who wish to secure a postgraduate teacher in any section of the country the names of the men who have the best fundamental knowledge and the greatest technical ability along a particular line, and who are available to give a course of this kind.

Second, the determination that a proper reward cannot come through the highly embellished certificate of the present plan, because if a man takes the six weeks' course in orthodontia which has been customary in the past, or a year's course at the Forsyth or a six months' course somewhere else, the certificate representing the shorter course is equally well embellished and means equally much to the patient who is pointed to it and ofttimes to the dentist who is referred to it. Therefore the value of such certificates is problematical. But if you establish a course of a given length of time with a given amount of instruction plus a given requirement, before you issue that certificate, and you purpose, through duly authorized universities and institutions which are legally and properly equipped to do so, to issue a degree of Bachelor of Dental Science or some degree of that type which shall be a guarantee that this man has not only taken the course for that period, but that he has proved efficient in the work, this might prove of great value.

These are all matters that we should think of, and it has occurred to me, in the short time I have had to consider this paper, that possibly those things would be of value in helping to stimulate the only man who is equipped to study dentistry, i. e.: The man with the degree D. D. S., and who has had several years of experience. The man without experience of some years after graduation is not equipped and therefore you cannot expect him to be competent though he has been graduated from a dental school. His intentions are all right, and if you give him time he will make good. But after all, if he still desires to give better service to the public, and he takes a postgraduate course and you give him a certificate as an accredited statement that he has done this work, it is not within the bounds of impossibility that this might be of assistance in helping us to deferentiate between the real and the assumed.

Dr. Alfred Owre, Minneapolis

I am very much impressed with some of the suggestions made by President Bowles, the most pressing of which seems to me the suggestion that this or some other body should place the hall-mark of authority on whatever is called graduate

work. Are we offering genuine graduate courses, or are we offering extension work. An extension course should not bring a certificate with it; it is not the kind that Dean Millberry has been offering in California, a short course. A course of a few weeks or even of two or three months would be of extension character. But a graduate course, which involves two or three years of resident work in a university, with the stamp of the university upon it, is a different thing.

I was very much interested in the reference made to the commercial man in dentistry, and recognized immediately that it was dangerous ground upon which Dr. Black was fighting—he almost got into the trenches. The very first thing the commercial man tries to do is to get this hall-mark of approval upon himself, and he usually tries to accomplish that through the university or college; then he begins in a most unscrupulous manner to exploit the profession and the public. We must guard against this by upholding a rigid standard for graduate courses. Are we courageous enough in this body, which perhaps is not as all-inspired as it might be in force and character with regard to our grand scheme of doing good —are we courageous enough to fight, to make sacrifices even, in order to eliminate this man from the profession?

Dr. Bowles
(Closing the discussion)

I would just like to say in closing that my idea about the commission was simply to have it collect from year to year the data upon which the work is being carried out, and to then make report to this body. I am as keenly alive as any one else to the fact that the Institute should have no elective or legislative function, and I had no such idea in making the recommendation. But simply to review what is being done and make report each year, the Institute to simply make suggestions as to what should be done and act in an advisory capacity.

I wish to thank you all for the consideration given my effort.

REPORT OF SECRETARY-TREASURER.

The Secretary-Treasurer submits the following brief report of the affairs of his office during the past year.

The usual routine work has been attended to and I wish to express my appreciation for the cooperation given. There is a matter in this connection, however, that I will take the liberty of bringing to your attention—that is, some folks don't attend to

their correspondence as promptly as they might—about 3,000 pieces of mail matter have been dispatched from the secretary's office this year, some of which has been duplicated several times over because replies to my communications (perhaps sometimes a form letter) were not forthcoming. As has been the custom for some years past the editing, publishing and issuing of the proceedings has devolved upon this office. The contract with the printer called for the delivery of the journals on May 13th. They were immediately distributed to the members by mail or by the Express Companies. It is interesting to note in response to my enquiry that one dean was satisfied to have four copies sent to his teachers and another asked for forty-six copies. There evidently is quite a variance in the interest and value of our proceedings. On the average thirteen copies were sent to the colleges members of the Institute. Seven hundred copies were ordered and 692 copies have been distributed as compared with 600 in 1915 and 500 in 1914. There have been a number of requests for copies from individuals and libraries, in many cases asking to have the address placed upon our permanent mailing list.

During the past year we have lost three members—the Texas Dental College through resignation, the Barnes Dental College through resignation following disbandment, and the Medico-Chirurgical, Department of Dentistry, because of consolidation with one of the other Philadelphia Schools. No new members have been added during the year and the membership at present is forty-six schools.

The following is the financial report for the past year:

Receipts:

Balance carried forward	$ 707.22	
Dues for 1916	120.00	
Dues for 1917	560.00	
Bank interest	7.98	
		$1,395.20
Disbursements as per ledger	$ 689.50	
Cash on hand and in bank	705.70	
		$1,395.20
Dues for 1916 remaining unpaid	$ 20.00	
Dues for 1917 remaining unpaid	360.00	
		$ 380.00

Respectfully submitted,

ABRAM HOFFMAN, Secretary-Treasurer.

January 23, 1917.

REPORT OF COMMISSION ON NOMENCLATURE.

Your Commission on Nomenclature begs leave to submit the following report:

We have had an increasing conviction that the general treatment of nomenclature will be most satisfactorily made in a dental glossary or dictionary. The terms collected by the present Commission, together with the list of terms published by a former Commission under the leadership of Dr. Guilford, may be considered the beginning of a dental dictionary.

In addition to the report of last year, three committees report at this time the following terms:

Committee on Operative Dentistry and Dental Anatomy report a list of over 600 terms which they have compiled during the year. This report represents a great deal of careful work and may be looked upon as the best compilation of terms covering these two subjects that has been made up to this time. Dr. Arthur D. Black, Dr. H. E. Friesell, Dr. A. C. La Touche, Dr. Daniel H. Squire, Dr. Fred W. Gethro constitute the Committee on Operative Dentistry and Dental Anatomy.

The Committee on Radiology report a list of 42 terms. This committee has submitted a minority showing a disagreement over the terms Radiology and Roentgenology. The test of time only will settle this question. The Committee on Radiology:

Dr. John F. Biddle, Chairman.

Dr. F. L. Satterlee.

Dr. H. R. Raper.

The Committee on Metallurgy report a list of some 140 terms, which have been carefully selected as pertaining particularly to Dental Metallurgy. The Committee on Metallurgy:

Dr. Marcus L. Ward.

Dr. Wm. H. Welker.

Dr. Alfred Owre.

After carefully reviewing the general situation of Dental Nomenclature, we beg to propose for adoption the following recommendation: The authorization of the Commission on Nomenclature and Executive Board, to enter into a contract with P. Blakiston's

Son & Co., Publishers, Philadelphia, to publish a dental dictionary under the general editorship of Dr. Wm. B. Dunning, of New York, under the following conditions:

1. The total expense of said dictionary to be borne by P. Blakiston's Son & Co.

2. The Commission on Nomenclature shall approve all terms incorporated in the dictionary.

3. The imprint of the Commission on Nomenclature, American Institute of Dental Teachers shall appear on the title page.

Respectfully submitted,
WM. H. WELKER,
MARCUS L. WARD,
F. B. MOOREHEAD, Chairman.

THE TEACHING OF THE ANCILLARY AND SO-CALLED "MEDICAL" SUBJECTS IN THE FOUR YEAR DENTAL COURSE.

DR. ALFRED OWRE, MINNEAPOLIS.

I have been asked to discuss the teaching of the ancillary and so-called "medical" subjects in the four year dental curriculum. These, as you know, include English, Technical Drawing, Zoology, Chemistry, Anatomy, Physiology, Bacteriology, Pathology, Pharmacology (Materia Medica), and Therapeutics. Since the contents of some of these courses, as taught at Minnesota, are found in the outlines distributed to you, I shall not give details of them orally, but shall concern myself with the broader aspects of their inclusion in the curriculum.

In attempting any rearrangement and improvement of the course of study, we must naturally keep before us the ultimate aim of the course. Since Dr. Hunter's epoch-making charges some years ago, the most optimistic and ostrich-minded of us has had to admit that something has been wrong. The old-time dentist has been found wanting; the modern dentist has been found out. We are challenged by the X-Ray, the microscope, and the test-tube. I need not dwell on the painful fact. We are agreed that a reorientation is imperative. Our problem, then, becomes, first, to discover what is wrong; second, how to set it right. We must not lay ourselves open to Chesterton's charge, "What is wrong is that we do not ask what is right."

The dentistry of the past, which we must concede to be more than half a failure, has undertaken to stand alone. It has considered itself a science of the purely physical order, concerned chiefly with the technique of filling holes. It has overlooked the fact that it is essentially of the animate order, with its source in biology, mother of the sciences which deal with living organisms. (Note: In this classification I follow Mr. J. Arthur Thomson's *Introduction to Science*, American edition, a book which I shall use freely throughout this discussion.) This detachment of dentistry from the group of biological sciences has been its great shortcoming. Particularly baneful has been its separation from medicine, for in the last analysis, dentistry is but a special field of medicine. One recalls the ancient parable of the vine and its branches. "The too intensely practical man has got so accustomed to the fruits of Science that he is apt to forget that these cannot be forthcoming if the roots die. Therefore to the critic who growls over the time spent on studying sea-weeds, when 'what we want is more wheat,' over embryological research instead of fish-hatching, over the theoretical puzzles of geology instead of the search for more coal and iron, we must answer, first, that man does not live by bread alone; second, that he must be patient if his desired practical results are to be sure; third, that Science is a unity, and the theoretical foundation is essential if there is to be progressive practical application; and, fourth, that, as a matter of fact, it has often been from the most unpromising theoretical investigations that great practical discoveries have come. Even for the sake of practice, Science should never submit to the over-practical man's cannon which makes immediate utility a stringent criterion of worthiness." (Thomson, *Introduction to Science*, *p. 235.*)

Yet this isolation has had an even graver side. It has involved the attitude of the profession toward the whole of life. Thomson says, "We all need to be reminded of Plato's demand that the true lover of science should be interested in the whole of his subject." I am tempted to paraphrase this to read, "We all need to be reminded that the worker in life shall be interested in the whole of life." A worker in life, though in a restricted field, the dentist is no less than the physician. Therefore, no less than the physician, he needs to hold constantly before him the largeness of life, the unity of life, and the possibilities of his part in life. Thomson brings this out so forcibly that I shall again quote at length from the *Introduction to Science* (*p. 116*). "As we think over the conflicting classifications of the sciences, we see that a frequent cause of confusions has been the attempt to map out territories as

preserves of particular sciences. This implies a wrong idea of the constitution of a science, which is defined not by its subject-matter, but by the categories under which it thinks of that subject-matter. Two sciences may work and often do work at the same material,—but with different ends in view, with different fundamental concepts, and with methods different in detail.

"Let us illustrate. An anthropologist may work for years at a particular societary form, and yet his results may be contributions to biology rather than to sociology. A psychologist may devote himself to the study of cats and dogs, and yet his results may not be contributions to biology in the stricter sense. A physicist may give persistent and profitable attention to the electrical changes associated with contracting muscle, and yet though he is in a sense dealing with organisms all the time, his results may be contributions to physics rather than to biology. Blocked apart for practical convenience, treated in separate books, expounded by different teachers, investigated in different laboratories, the sciences are, after all, parts of one discipline, illustrations of one method, attempts to make clear—if never to solve—the one great problem of the Order of Nature. They form, or should form, one body of truth, and they gain in value the more they are correlated. This is the ideal alike of the Philosopher's Stone, of the Encyclopedia, of the University, and of the most modern scientific synthesis. Let us briefly consider it from various points of view.

"When we think of a living creature with vividness, several major impressions stand out clearly in the mind. In the first place, the organism is a unity. It has many members, but one body; many activities, but one life. It develops and grows and varies and acts as a unity. Therefore, we feel sure that while it has to be made the subject of many different sciences,—anatomy, physiology, embryology, not to speak of chemistry and physics, and not forgetting psychology, the scientific truth about the living creature cannot be reached unless the results of the various scientific inquiries are pooled, and unless the fundamental fact of the unity of the organism is recognized.

"In the second place, the living creature cannot be isolated or studied *in vacuo*. It has an inanimate environment from which it is scientifically inseparable, and it sends its tendrils into the lives of many other creatures. If we are to come nearer knowing the truth about the living creature, we must study it in its inter-relations. But that involves the convergence of many sciences, which

approach their ideal completeness in proportion as they are correlated.

"In the third place, we have to bear in mind that the living creature is passing by as one of a great historical pageant. It is an heir of the ages, only to be understood as the resultant of numberless factors—mechanical, chemical, physical, and animate—which have gone to its shaping. It has gathered into itself the sunshine and air, the wind and the rain of millennia. It requires a unity of the sciences if it is to be understood. Nor is it merely a passer-by in a great procession, which we can study all too briefly before the torch it carries goes out and it fades away, it is an individualized phase in the ceaseless circulation of matter and energy. To change the metaphor again, it is a whirlpool in the river of time. All of which makes us feel that the sciences are most scientific when they are most united. The higher the subject in the scale of being the more obvious this is, for Man most of all, but even in regard to the non-living the inter-relatedness of things makes a unification of sciences necessary. Who, for instance can understand the earth as it is apart from its living tenants? The very dust throbs with life." I wish to emphasize the phrase, "the great problem of the Order of Nature." Until the dentist feels the glory of this pageant of life, until his spirit thrills to the march of its many forms down the ages, he cannot live up to the best that is in him. Until he feels the glow of the scientific impulse, his life will be spent, as one critic phrased it, "looking at the same thirty-two teeth." What right have we as dental educators to deny the student this fulness of life? To point his way to the fullest realization of the possibilities of his profession should be our pleasure. Certainly it is our duty. Not until we have fulfilled this duty can the dentist take the place in the common and communal life which is crying out for him. In the vision of a future commonwealth where ill-health and disease are held in the leash of science, a vision which even in our day may merge into reality, the dentist holds an honored seat. But he cannot mount to this post if we withhold a helping hand. Without our clear-eyed acknowledgment of the weakness of the old school, and our whole-souled cooperation in setting it right, the student cannot find his highest self; without this acknowledgment and this cooperation the state will suffer.

Perhaps we need not adduce evidence as to the indispensability of a broad scientific foundation for the future dentist. I cannot resist, however, emphasizing it with quotations from two eminent educators and thinkers. First, Huxley. "Education," he writes, in *Lay*

Sermons, "is the instruction of the intellect in the laws of Nature, under which name I include not merely things and their forms, but men and their ways; and the fashioning of the affections and the will into an earnest and loving desire to move in harmony with those laws. For me education means neither more nor less than this. Anything which professes to call itself education must be timed by this standard, and if it fails to stand the test, I will not call it education, whatever may be the force of authority, or of numbers, upon the other side."

Says Herter, in the preface to his noteworthy book, *Biological Aspects of Human Problems*. "My own faith is so strong in the educative value of a serious biological conception of life, that I offer this essay, hoping its spirit may evoke a sympathetic response in those who, like myself, are striving, not without pain, to find a more consistent guide to those complicated personal reactions which we call conduct."

Equally pertinent is Mr. G. K. Chesterton's plea for what he calls the "unpractical man." "There has arisen in our time," he writes in *What's Wrong with the World*, "a most singular fancy—the fancy that when things go very wrong we need a practical man. It would be far truer to say, that when things go very wrong we need an unpractical man. Certainly, at least, we need a theorist. A practical man means a man accustomed to mere daily practice, to the way things commonly work. When thinks will not work, you must have the thinker, the man who has some doctrine about why they work at all. It is wrong to fiddle while Rome is burning; but it is quite right to study the theory of hydraulics while Rome is burning.

"It is then necessary to drop one's daily agnosticism and attempt *rerum cognoscere causas*. If your aeroplane has a slight indisposition, a handy man may mend it. But, if it is seriously ill, it is all the more likely that some absent-minded old Professor with wild white hair will have to be dragged out of a college or a laboratory to analyze the evil. The more complicated the smash, the whiter-haired and more absent-minded will be the theorist who is needed to deal with it; and in some extreme cases, no one but the man (probably insane) who invented your flying-ship could possibly say what was the matter with it. If our statesmen were visionaries, something practical might be done."

That we shall feel repaid for our struggle to fill the place that is calling for us, we have the word of the great Helmholtz,—"As the

highest motive influencing my work—though not reached in my early years—was the thought of the civilized world as a constantly developing and living whole, whose life, in comparison with that of the individual, appears as eternal. In the service of this eternal humanity my contribution to knowledge, small as it was, appeared in the light of a holy service, and the worker himself feels bound by affection to the whole human race, and his work is thereby sanctified. This feeling all can theoretically understand, but long experience of it alone can develop it into a powerful and steady impulse."

A very concrete and direct presentation of one phase of our problem occurs in the British Journal of Dental Science for February 1, 1916. This British criticism of the teaching methods in prosthetics I quote at length because it is but too typical of what we must face in many other branches of our teaching. "The arrangement of teaching and of examination is an extraordinary one, which does not make for clear thinking or thorough knowledge. The dentist is concerned with physiology, with the working of metals, and hence he needs a competent knowledge of chemistry. To acquire reasonable acquaintance with prosthesis and dental surgery he must possess more than a nodding acquaintance with physics and anatomy. Since dental treatment is not merely the extracting or filling of teeth the well-informed dentist must *know* something of medicine —and there is a vast difference between *knowing* and having read a cram-book upon this or any other subject. Pathology is of profound importance not only to the physician and the surgeon, but it should bulk very large on the horizon of the dentist. And yet comparatively few of the students who are presented for examination know much about any of these subjects. According to Mr. Shaw, the failure to master prosthesis is due to the fact that this subject is taught before its *raison d'etre* is understood. The same is true of many other subjects, since they are jumbled up together after the handicraft side of the professional work is far advanced—and, further, because no serious effort is made to enable students to understand that subjects not actually dental have a really important bearing on their life's work. The whole matter of dental education is, we believe, under consideration, and one may hope that those who are taking its revision in hand will attempt rather a re-arrangement than merely whittling down the subjects. The student should have some general knowledge, a firm grasp upon rudimentary scientific subjects and a rational concept of the science of dentistry (which includes some medicine and much surgery as well as practical skill), and his art."

A no less scathing arraignment appears in the Norske Tandlaegeforenings Tidende for February, 1916, in which Dr. O. Berner calls attention to the demand of the present time upon the dentist and the necessity for a readjustment of the course to meet it, especially so as to enable the student to think in biological terms.

Logically we might next apply these general considerations on the value of science to the particular sciences included in the four year course. First, however, let us take up briefly the ancillary subjects of rhetoric and technical drawing.

It is not so far a cry from science to rhetoric as might at first appear. In discussing the scientific mood, Thomson writes, "One of the expressions of the scientific endeavor after clearness is to be found in precision of speech." Yet how difficult for the average scientific student to express himself precisely—how difficult, indeed, for him to express himself at all. There are few of us who do not feel ourselves hampered by this disqualification, our very usefulness often restricted by our inability to say clearly, accurately, and tellingly what we think. If it is our duty to help the student find himself, it is no less our duty to help him express himself. A freshman course which teaches him this is of incalculable benefit throughout the remaining three years. Far from being a waste of time, it is a great economizer of both time and energy. This consideration should rule out any attempt to teach composition as we go along, in conjunction with other courses. This method was long since abandoned by secondary schools as illogical, inefficient, and uneconomical. In establishing a firm course of not less than 96 hours, we but follow the lead of other technical schools, such as schools of chemistry, physics and engineering. The fallacy of any other procedure is too apparent to warrant serious consideration.

This course in rhetoric, so-called, should not deal solely with composition. To many a boy whom an elementary course in "English," taught, likely as not, as an aside by the manual training teacher, has given his sole contact with literature, this course of ours will afford his only insight into the world of letters. We dare not deny him the opportunity to discover for himself the solace of books, to touch hands with the master spirits of all time. The course, then, should include a carefully selected list of books for outside reading, and these should be studied and discussed under the most inspiring teacher to be had. Such a course may open to the student an avenue into a hitherto undiscovered country. It may point the way to a broader and higher life.

In regard to the course itself, I should like to quote Mr. C. A. Herrick of the University of Minnesota, who says, "This course differs a little from the ordinary standardized course in freshman rhetoric. Because of the specific practical needs of the dentistry student, the study of exposition is given a larger place in the course; in the second semester, especially. There is emphasis on process-exposition.

"Some attempt is made, too, to encourage the study of good literature, rather more than is possible in the usual academic course in rhetoric."

The following is the course as taught at Minnesota:

FIRST SEMESTER.

Text-books: *Canby, English Composition, Revised.* The first 166 pages are carefully studied. Paragraph, sentence, word are studied in the order named. *Wolley, Handbook of English Composition.* Used for reference, particularly in theme-revising.

Composition: A minimum of twenty themes, ranging from paragraph themes to papers of 1,500 words.

Reading: At least books to the amount of 45 credits chosen from the printed list. Three times a semester written reports on the reading are required.

SECOND SEMESTER.

Text-books: *Scott & Zeitlin: College Readings in English Prose.* The first 231 pages are carefully studied and analyzed. *Woolley: Handbook of Composition.* Used for reference, chiefly in theme-revising.

Composition: A minimum of eighteen themes, ranging in length from 250 to 1,500 words.

Reading: As in first semester.

As aids to the scientific student in expressing himself, technical drawing travels hand in hand with rhetoric. It helps him, as Ruskin says, "to set down clearly, and usefully, records of such things as cannot be described in words, either to assist your own memory of them, or to convey distinct ideas of them to other people." I doubt that Ruskin had in mind a set of teeth when he wrote these words. Yet nothing could be more difficult to "describe in words;" and it is highly necessary that the student "assist his memory of them" and "convey distinct ideas of them to other people." The student, moreover, will find this training invaluable in the laboratory work which forms so large a part of his courses

in the biological and the applied sciences. And there is practically no technical course in which he will not need it. In dental anatomy he has to draw; in gross anatomy he has to draw; in prosthetic dentistry, in crown and bridge work, in operative dentistry he has to draw. It is obviously a saving of time and energy to give him a course in drawing first.

Even more important is the training afforded by technical drawing to the eye and hand. In his technical work keenness of perception and delicacy of touch are absolute essentials. Dentistry is an art, and "the excellence of an artist (I quote Ruskin again) as such depends wholly on refinement of perception, and—it is this, mainly, which a master or school can teach; so that while powers of invention distinguish man from man, powers of perception distinguish school from school. All great schools enforce delicacy of drawing and subtlety of sight; and the only rule which I have, as yet, found to be without exception respecting art is that all great art is delicate." Ruskin refers, of course, to schools of art; but his remarks in the main are not inapplicable to schools of dentistry!

The value of drawing in the cultivation of perceptive powers is recognized by no less eminent an educator than President Eliot; he has recently advocated its universal adoption in secondary schools as an aid to such development. If technical drawing is desirable for every high school boy by way of general preparation, it is obviously essential to the technical student as part of his professional training.

In regard to the course at Minnesota, I should like to quote Mr. W. H. Kirchner, Professor of Drawing and Descriptive Geometry, in the College of Engineering, who says, "In the course in Technical Drawing the main emphasis is placed upon the representation of things which are of scientific concern to the student in dentistry.

"The work includes the preparation of the conventional charts and diagrams of particular interest to the dentist in addition to the construction drawings of tools, instruments, and apparatus.

"The variation in ability among different individuals is so great that the exercises are adjusted as much as possible to the capability of the student. This variation is both in kind and degree.

"Since the drawing itself merely consists of significant marks, the attention of the student is constantly directed to the particular characteristics which are to be exhibited.

"It is expected that the drawing as the result of the final synthesis will be a true record of fact even if its aesthetic value is low. Scientific drawing depends upon many inter-related factors and like other forms of scientific expression can gain much if correlated with other studies.

"General: The course includes freehand and mechanical drawing in ink and pencil.

"Theory: The geometrical basis of scientific representation is presented as rigorously as the mathematical proficiency of the student permits. Since every conventional representation of spatial things upon a plane must of necessity include some misrepresentation, it is important that the underlying principles be thoroughly understood. Otherwise a correct interpretation is impossible.

"Projection: The major part of the work is in plan and elevation drawing, orthographic projection. This includes simple and other views, sections and developments, detail and assembly drawing.

"Perspective: A few of the laws of perspective are presented. The appearance of things is studied with a view to emphasize the organic structure rather than the proper regulation of light and shade, and foreshortening."

The following is an outline of the plates made in this course:

Project Number	FIRST SEMESTER.
4101	Orthographic projections of a cube having letters projecting from each face. (From description.)
4102	Orthographic projections of an object inside of a cube. (As dictated.)
4103	Projections and sections cut from simple objects. (Drawn from directions.)
4104	Exercise on vertical Gothic lettering and block letters.
4105	Two methods of constructing an ellipse and the projections of a right pentagonal pyramid showing true size of one of its faces.
4107	Projections of a right cylinder, and a right cylinder cut by a plane.
4106	Projections of a regular hexagonal prism and a regular hexagonal pyramid cut by a plane. Find the true size of section.
4108	Projections of a sphere and a cone cut by a plane.
4109	Line exercise for inking and use of instruments.
4110	Lettering exercises in pencil and pen.
4111	Lettering exercises in pencil and pen.

4112 Lettering "A Page of Cautions" or equivalent.
4113 Orthographic, perspective, isometric, and oblique drawings from models, and translating.
4114 End view and perspective of a crank. (Drawn from directions.)
4115 Working drawing of a Whitney Moulding Flask. (Drawn from flask.)
4116 Working drawing and pen sketches of casts made from upper and lower plates. (Drawn from casts.)

SECOND SEMESTER.

4217 Plotting of graphs, rectangular corordinates. (Plotted from equations.)
4218 Working drawing of flask. (Drawn from flask.)
4219 Pencil sketches of upper and lower teeth. (Drawn from casts.)
4220 Pen sketches of upper and lower teeth. (Drawn from teeth).
4221 Front view of centrifugal casting machine. (Drawn from model.)
4222 Top view of a centrifugal casting machine. (Drawn from model.)
4223 Side view of centrifugal casting machine. (Drawn from model.)
4224 Working drawing of a Fletcher Burner. (Drawn from model.)
4225 Pen sketches of lower jawbone and upper and lower casts. (Drawn from bone and casts.)
4226 Pen sketches of lower jawbone. (Drawn from bone.)
4227 Working drawing of root elevator. (Drawn from model.)
4228 Working drawing of White handpiece. (Drawn from model.)
4229 Working drawing of White handpiece. (Drawn from model.)
4230 Working drawing of contra angle handpiece. (Drawn from model.)
4231 Working drawing of half section and half elevation of hypodermic syringe No. 1.
4232 Working drawing of half section and half elevation of hypodermic syringe No. 2.
4233 Working drawing of a piece of dental furniture.
4234 Pen sketch of a human skull. (Drawn from skull) Profile.
4235 Pen sketch of a human skull. (Drawn from skull.)
4236 Pen sketch of Nerve and Blood Supply. Introducing the use of color.

Note: The plates in pencil only have not been reproduced.

We may now discuss briefly the relation of chemistry and the biological sciences formerly mentioned to the four year dental course. (Note: In the classification of sciences we have been following, Thomson divides the concrete sciences into five general groups: chemistry, physics, biology, psychology, and sociology.)

Chemistry has so long been recognized as fundamental to all medical and dental studies that it requires little emphasis here. The college requirement in this subject should vary with the student's high school preparation. The student with high school credit in elementary chemistry should be required to spend about 200 hours on advanced general chemistry and qualitative analysis, including both lectures and four hours weekly of laboratory study. The student without high school credit should be required to spend at least 300 hours on inorganic and qualitative chemistry. One third of this should be devoted to the elementary work. All students should pursue an introductory course in inorganic chemistry as outlined. I am indebted for the following synopsis to Dean George B. Frankforter of the School of Chemistry, University of Minnesota.

Week.

1. Preliminary work and scope of Organic Chemistry.
2. The Hydrocarbons.
3. The Alcohols.
4. Fermentation and Enzymes
5. The Halogens.
6. The Aldehydes.
7. The Acids, oxy- and polybasic.
8. Acid derivatives, including the amides, urea, proteins, etc.
9. The amines, including phosphorus, arsenic, etc.
10. Cyanogen compounds.
11. Carbohydrates.
12. Aromatic compounds, preliminary, including hydro-carbon homologues.
13. Nitro and amino compounds, including aniline and its derivatives, dyes, etc.
14. Diazo compounds and the phenols.
15. The heterocyclic compounds and their derivatives.
16. The pyridine and quinoline derivatives, including the alkaloids.

The further list of sciences now embodied in the four year course encourages us to hope that the great fault of old-time

dentistry is in a fair way to be corrected. Zoology, anatomy, physiology, bacteriology, pathology, pharmacology, and therapeutics—all may be classed under the rubric biology. And it is to our past failure to think in biological terms that we may trace many of our shortcomings. If these sciences, however, be interpreted largely; if they be studied thoroughly and in the proper sequence; if they be studied chiefly in the laboratory—the only proper classroom for a science—Dr. Hunter's stigma on dentistry will soon be effaced. I cannot urge too strongly the necessity for thorough laboratory study of any science. The dentist is usually drawn from that major portion of mankind which finds expression in the concrete, not the abstract. Put him in a laboratory with a scalpel and a dead frog, and he will work out the nervous system of the frog with a degree, at least, of pleasure and of profit; but put him in the classroom and lecture for fifty minutes on the nervous system of the frog, and he will probably go to sleep.

No sub-division of biology better illustrates the general principles of the great mother-science than does zoology. For this reason, if for no other, it should be given at least 192 hours, most of which should be spent in the laboratory. Since zoology involves the underlying principles of the general science of biology, it should obviously be studied during the first year. Moreover, it should be gone into thoroughly, with the principles applied in a variety of ways, that they may have an opportunity to soak in. In regard to this course, I should like to quote Dr. Charles P. Sigerfoos, Professor of Animal Biology in the University of Minnesota.

"The aims of the course, in order of increasing importance, are the following:

1. To give the student a body of facts of animal life as knowledge which every educated person should know; to give him a substantial addition to his working vocabulary of words which he can use with a fair degree of precision.

2. To give him habits of diligence and promptness in doing good laboratory work on time; powers of concentration by expecting each student to do his best in the laboratory work; discipline of hands and eyes through the painstaking manipulation and study of materials in the laboratory; a sense of the value of close examination of facts and details, not as important knowledge, but as evidence got first hand, and that got from other sources; a sympathy and respect for scientific work and workers.

3. An introduction to the wonder and mystery of life; a healthy love for the animal side of nature; sanity and poise through contact with many things in nature very wonderful and beautiful, which they are accustomed to consider nasty and horrid; a healthy and correct view of reproduction as part of the natural phenomena of nature and life.

4. To give him a body of the broad principles and generalizations of zoology—of structure, physiology, reproduction, classification, evolution, etc., a comprehensive view of the animal life of the earth.

5. To help give him a proper viewpoint of man's relation to the universe, and a substantial addition to his philosophy of life."

The following is a pretty close statement of the course as given at Minnesota:

Week.

1. The frog—external anatomy; beginning dissection of general anatomy.
   The frog—general anatomy finished and drawn.
2. The frog—dissection of the heart and venous system. Drawing.
   The frog—dissection of the heart and arterial system. Drawing.
3. The frog—dissection of the venous and arterial systems reviewed and finished.
   The frog—dissection of the urogenital systems of the frog. Drawing.
4. The frog—skeleton of frog—fore- and hind-limbs and girdles. Drawings.
   The frog—skeleton of frog—vertebral column and skull. Drawings.
5. The frog—muscular system. (Not always given.)
   The frog—nervous system. Drawings.
6. The frog—development—segmentation stages of eggs and larval stages. (Sometimes two days given to development.)
7. The elements of the tissues—blood of amphibian and man; starfish eggs.
   The elements of the tissues—types of epithelium. Drawings.
8. The elements of the tissues—mitosis in salamander epithelium. Drawings.
   Nerve and muscle cells and fibers.
9. The Protozoa—Ameba proteus, and such other species for comparison as are available. Drawings for structure and movement.

Euglena: Eudorina: Volvox: this series as showing border line forms between the animal and plant kingdom, and as illustrating the evolution of cell-groups and of sex. Drawings.

10. Paracium—structure; reproduction by fission; conjugation so far as time permits. Drawings.

Physiology, reactions and behavior of Paramecium, as illustrating the fundamentals of all physiology. Reactions to various chemical reagents, thermal, and other stimuli.

11. Vorticella and other miscellaneous Protozoa, illustrating variety among simple forms of life. Gregarina, illustrating parasitic Protozoa.

Hydra and general structure of hydroids. Drawings.

12. Histology of Hydra. Drawings.

Jelly fish and hydroids.

13. Sea Anemone.

Parasitic worms. Liver fluke, tapeworm, trichinella, etc.

14. Earthworm; external, and experiments with living works, with fundamental reactions, etc. Dissection and structure.

15. Dissection and structure of earthworm. Histology of earthworm.

16. Fresh-water mussel.

17. Fresh-water mussel. Lobster and crayfish, external.

18. Lobster and crayfish, general dissection, nervous system, etc.

19. Appendages of these forms, study of serial homology.

20. Miscellaneous crustacea. Primitive and specialized forms. Other arthropods spiders, centipedes, etc.).

21. Grasshopper. Insect larvae.

22. Other insect developments. Other insects.

23. Starfish.

24. Other echinoderms. (These last forms are usually brought in before the mollusca.) Amphioxus. Whole and sections.

25. The dogfish; general dissection, vascular system. Nervous system and eye muscles.

DEVELOPMENT AND EMBRYOLOGY OF ANIMALS.

26. Development of frog.

27. Fertilization, segmentation, embryonic stages of echinodrems.

28. 30-hr. chick embryo; sections of 30-hr. chick.

29. 55-hr. chick embryo; sections of same.

30. Running stages of chick embryos, to show the gross development of form, etc.—24-hr.; 3 or 4 days; 5 or 6 days; 8 or 9 days stages; 10 or 15 days stages.

31. The development of the eye.
32. The development of the vertebrate plan of structure.

(The work on embryology is accompanied by numerous demonstrations on living chick embryos, and upon living mammalian embryos to show placentation, the embryonic membranes, etc.)

As the laboratory work progresses, it is correlated with the class-room work. Besides, in the class-room, the fundamentals of zoology are brought out by lectures, quizzes, and from the laboratory work. Stressed especially would be the following: Fundamentals common to all living things; difference between animals and plants; fundamental constitution, structure and properties of protoplasm; the fundamental nature of nutrition and other physiological processes; the classification to the animal kingdom, and the principles of classification; the differentiation of structures as the basis for the division of labor of the parts of the body in higher animals; the reproduction of animals, including giogenesis, spontaneous generation, the mechanism of heredity, the maturation, fertilization, segmentation and later development of the germ cells; the progressive evolution of sex; the evolution of animal life (about five lectures); just a little of the history of biology.

With such a foundation, we can proceed with the sub-sciences assured that the student is prepared to grasp advanced work. The course in morphology should extend over at least a year. Of the 400 to 450 hours it requires, about two thirds should be given to gross anatomy and the balance to histology and embryology. A glance at the outline* of the course as given at Minnesota will show that the dissection of the entire body is not advocated; in the main it should not be necessary with a thorough preparation in zoology. Without such a preliminary course it would be necessary to extend the courses in morphology and physiology, as well as in bacteriology and pathology, sufficiently to acquaint the student thoroughly with the fundamentals of biology. Besides this foundation work, the student receives instruction in applied anatomy as part of the work in dental anatomy, crown and bridge work, operative dentistry, prosthesis, orthodontia and oral surgery.

Physiology should be allotted about 150 to 200 hours. Two thirds of this should be devoted to physiology proper, and one third to physiologic chemistry. The course in physiology should include the study of the general functional properties of tissue cells; of muscle-nerve functions; of blood, the circulation, respiration, digestion, secretion, and excretion. The course in physiologic chemistry

*Outlines distributed.

should include a review of inorganic chemistry and an introduction to physiologic chemistry, and the study of carbohydrates (including enzymes), fats, proteins, foods, digestion, urine, and metabolism.

Bacteriology should receive not less than 100 hours, extended over one semester. The following outline shows the course in this subject, as conducted by Dr. H. E. Robertson, of the Department of Bacteriology at the University of Minnesota.

One semester of sixteen weeks, two periods a week; each period (a) one hour lecture; (b) two hours laboratory work.

First Week:

(a) Historical introduction to bacteriology. Scope and methods of bacteriology. Morphology and classification of bacteria.

(b) Experiences in staining and cultivating bacteria on simple media. Gram's stain.

Second Week:

(a) Growth and nutrition of bacteria. Fermentation. Effects of heat, moisture, etc., on bacteria.

(b) Spore stain and motility. Making of simple media.

Third Week:

(a) Methods of destroying bacteria. Sterilizing; antiseptics and disinfectants. Asepsis, quarantine, etc.

(b) Testing of disinfectants (phenol coefficient). Heat test for spores. Plating mixed cultures. Chromogenic bacteria.

Fourth Week:

(a) Review and written quiz.

(b) Plating and studying organisms from air, dust, skin surfaces, and mouth.

Fifth Week:

(a) Infection. Bacterial toxines. Portals of entry for infection; resistance to infection offered by tissues.

(b) Laboratory studies of staphylococci. Studies of pus. Animal experiments.

Sixth Week:

(a) Humoral resistance, or immunity. Antitoxines, agglutinins, lysins, etc. Vaccines and serums.

(b) Gonococcus, meningococcus, micrococcus catarrhalis.

Seventh Week:

(a) The pyogenic cocci.

(b) Streptococci. Blood agar plates.

Eighth Week:

(a) Streptococci, especially mouth streptococci. Classification and pathogenicity.

(b) Streptococci continued. Animal experiments. The pneumococcus; capsule stain.

Ninth Week:

(a) Intestinal bacteria. Typhoid fever.

(b) Colon-typhoid group of bacteria with differentiating media. Flagella stain. Agglutination tests.

Tenth Week:

(a) Review and written quiz.

(b) Bacteriological analysis of water (B. coli.).

Eleventh Week:

(a) Diphtheria. Bacteriological diagnosis, making of antitoxin, etc.

(b) Diphtheria bacilli and throat cultures.

Twelfth Week:

(a) Non-diphtheritic anginas. Epidemic streptococcus sore throat. Vincent's angina. Syphilis and the spirochaeta pallida, mouth spirochaets, and fusiform bacilli.

Thirteenth Week:

(a) Tuberculosis.

(b) Tubercle bacillus and sputa.

Fourteenth Week:

(a) The higher bacteria, especially actinomyces. Mouth bacteria not hitherto considered, leptothrix, buccalis, endamoeba bucalis, etc.

Fifteenth Week:

(a) The bacteriology of dental caries, pulpitis, alveolar abscess, and pyorrhea alveolaris.

(b) Unknown mixed cultures.

Sixteenth Week:

(a) Final examination.

(b) Unknown mixed cultures.

The subject of pathology should receive from 100 to 150 hours. The outline given below will give an idea of the course at the University of Minnesota, under the direction of Dr. H. E. Robertson.

COURSE IN PATHOLOGY.

One semester of sixteen weeks, two periods a week; each period one hour lecture, two hours laboratory work. (The laboratory work will closely parallel the lectures, and is not here detailed separately.)

First Week:

Review of histology; the structure and physiology of the cell. The pathology of the cell; abnormal infiltrations and pigmentations.

Second Week:

The pathology of the cell, continued. Degenerations and necroses.

Third Week:

Circulatory changes: anemia, hyperemia, thrombosis, embolism, and infarction. Review and quiz.

Fourth Week:

Introduction to inflammation. Serous and fibrinous exudates. A study of cells concerned in inflammatory processes.

Fifth Week:

Purulent inflammations. Subacute and chronic inflammations. Tissue repair—granulation tissue and fibrosis.

Sixth Week:

The pathology of acute infectious diseases. Diphtheria, pneumonia, scarlet fever, acute streptococcus infections.

Seventh Week:

The pathology of rheumatism. The pathology of typhoid fever. Review and quiz.

Eighth Week:

The infectious granulomas: tuberculosis, syphilis, actinomycosis.

Ninth Week:

Regenerative changes. Pathological new growth. Benign tumors.

Tenth Week:

Malignant tumors.

Eleventh Week:

Abnormalities of development, with especial reference to the face and jaws. Review and quiz.

Twelfth Week:

Stomatitis. Diseases of the tongue; tonsils.

Thirteenth Week:

Diseases of the gums, especially pyorrhea alveolaris. Dental caries. Diseases of the pulp.

Fourteenth Week:

Acute and chronic alveolar "abscess." Dental root cysts of inflammatory origin.

Fifteenth Week:

Tumors of the jaws, especially those of dental origin.

Sixteenth Week:

Review. Practical examination, final examination.

Pharmacology should receive from 50 to 100 hours. The course at Minnesota, conducted by Dr. R. A. Hall, of the Medical School, takes up the following sub-divisions of the subject:

1. Nature of pharmacological and drug actions with relation to chemical and physical laws.
2. Antiseptics.
3. Hemostatics and styptics, astringents and caustics.
4. Protectives, irritants, bleaching agents, antacids, etc.
5. Preparations for mouth and teeth.
6. Anaesthetics, local and general.

I have been obliged to abbreviate the discussion on so many important subjects that I believe it best to leave out Therapeusis for the present. Any adequate discussion of it would involve a somewhat lengthy consideration of mechanics as well as drugs.

I should not wish to be interpreted as insisting on a uniform and rigid program to be forced upon all dental schools regardless of circumstances. Differences in constitution, endowment, equipment, and outside connections render such a plan neither feasible nor desirable. A dental college forming part of a large university were short-sighted to say the least if it failed to avail itself of the teaching, laboratory, and clinical facilities afforded by the other colleges. Because of the opportunities for such cooperation, a university dental school has a logical advantage over a private school, unless the latter be substantially endowed. It might often be possible, however, for a private school which, let us say for purposes of illustration, lacked laboratory facilities and the means of supplying them, to ally itself with a nearby technical school or university in order to supply this deficiency without either substituting inferior equipment or duplicating equipment at a heavy expense.

Such a policy were highly to be commended. Other legitimate variations from a rigid standard are imaginable. For instance, a school weak in laboratory equipment and without connections which could supply the deficiency might specialize strongly in other lines where greater strength would be possible. To provide such elasticity was to my mind the reason for the general character of the Chicago clause regarding electives.* Our paramount duty now is to hold steadfastly to the same high purpose—to make in each college the best dentist it is humanly possible to make under existing conditions, and to improve those conditions as rapidly as possible in accordance with the highest standard we can set. Only by so doing shall we avoid the fatal rock of "trying to secure a 'technical education' without an adequately substantial scientific training."

DISCUSSION.

Dr. E. C. Kirk, Philadelphia

I never have listened to a presentation of any subject by Dean Owre which has so deeply interested me. I am absolutely in harmony with what I regard as the fundamental spirit of Dr. Owre's paper. He approaches his theme not only in the scientific spirit, but he considers his problem from the point of view of the trained diagnostician. He has found himself, as we all have found ourselves, to be confronted in this problem of education with a difficulty, and it is a serious difficulty in that we have been endeavoring too long to manufacture dental silken purses out of the sows' ears of the preparatory schools. We have been making from this material some fairly good leathern purses in the past; but the demand for the silken purse is a constantly increasing one. The silken purse is no longer a luxury, it has become a necessity in all departments of biological activity, and it is up to us as educators to see to it that our educational system, if we may so call it, produces its own proportion of silken purses and does not turn out too large a percentage of purses of the leathern variety. That, I believe, expresses in allegorical form, the essential difficulty which Dr. Owre as a scientific diagnostician in the realm of dental education, is endeavoring to portray. So I am wholly at one with him with reference to his diagnosis of the situation. His plea is for

* The following is the resolution adopted in Chicago: "That it is the sense of this meeting that we approve the plan of a four-year course of not less than 4800 working hours, the curriculum to consist of not less than 4200 hours devoted to such subjects as are deemed essential to the technical and scientific education of the dental practitioner, with the understanding that ancillary subjects shall be elective and not consume more than 600 hours of the course." To this the following amendment was made: "With the understanding that the word elective appearing in said resolution as related to ancillary subjects shall be a function to be exercised by the administration of the respective dental schools and not by the students thereof.

a scientific education, or an education in what we call the underlying sciences in dentistry. He has quoted from Mr. Huxley. Let me read the quotation so that I may do him no injustice: "'Education,' says Huxley in his 'Lay Sermon,' 'is the instruction of the intellect in the laws of nature, under which name I include not merely things and their form, but men and their ways, in the fashioning of the affections and the will into an earnest and loving desire to move in harmony with those laws.'" Huxley goes on to state further that education means to him neither more nor less than this.

I do not think that it is possible for us to controvert that position. It is expressive, it seems to me, of the fundamental ideal which should dominate all of us in our educational work. Expressed in other terms, it means the inculcation of what we called "the scientific attitude of mind" towards the problems which are presented to us in the dental curriculum, and the mental attitude that we develop in our students in relation to the subjects of the dental curriculum. And what do we mean by that scientific attitude of mind? If you look in the dictionary or in various works, you will find that *Science* is generally defined as a coordinated or orderly system of knowledge. And we deduce from this that the adjective form *scientific* must mean of or relating to that system of coordinated knowledge.

But it means more than that. I apprehend that we shall not arrive at a complete and satisfying definition of the term *scientific* as expressing a mental attitude toward our work until the psychologists shall have reduced their data to a more scientific basis and can furnish us with the material from which to form a definition of our word *scientific* as expressive of an intellectual process or mode of thought. But certainly it expresses what our attitude of mind should be toward the scientific work in that department of biology with which we are concerned as teachers. It implies the judicial frame of mind with respect to the mutations and interactions of natural phenomena and the realization as part of our mental equipment of the inexorable precision of natural phenomena in the relationships of cause and effect. Nature is not a haphazard thing. The great fundamental conceptions of science should become so ingrained in the mind of the student that he does not expect that 2 and 2 in the matter of biologic data will make something more or something less or pretty nearly 4—but that the sum of 2 and 2 is absolute so far as those relations are concerned. Taking the example which has been referred to a number of times, the question

of chemistry as one of the underlying sciences of the dental course, the man who has studied chemistry attentively, who has studied it not merely for the practical use that he can make of it, but rather as an intellectual training, very quickly conceives that the idea of 2 and 2 in chemistry cannot make more nor less than 4; that the laws of the combination of matter mean that these combinations take place down to the uttermost molecule, the uttermost ion, the uttermost particle, measurable in exact mathematical terms, in exact quantitative relations and neither more nor less. By encouraging the student to believe that he cannot add a little or take from, or in some way modify the inexorable precision of the phenomena expressed by what we term nature's laws, is one of the ideals that we must aim to achieve in helping the student to require what we have called the scientific attitude toward his work. Any one who has spent time in the study of biology in its various expressions can have, I believe, no doubt as to the soundness of that view and I take it that is what is concerned in the statement quoted by Dr. Owre, setting forth Mr. Huxley's definition of education.

I must, however, take issue with Dr. Owre, not as to his diagnosis of the condition that we have to meet—for with that I am in agreement with him; but when it comes to his therapeutics, his proposed treatment of the disorder, then I do take issue with him. I take issue with him as to the propriety, as to the moral righteousness, of introducing into the dental curriculum a course of training in English, or any other thing that ought to have been learned by the man before he enters upon the professional course. I take exception to the principle upon which Dr. Owre defends the introduction of drawing into the professional course. If skill in drawing is something the man needs in his professional course as he certainly does, then he should have learned to draw before he came into the course. Do not make any mistake about the point of difference I am making: He must use drawing in his dental course as a means for delineation of the thing in mind to materialize and thus fix more definitely in memory the data of dentistry which he had previously visualized from didactic teaching. A man cannot draw a thing he has not visualized any more than he can tell what he does not know. The student should utilize drawing just as he should use photography. The ability to draw is not what we should teach him, but we should require him to utilize his knowledge of drawing in order to educate himself in dentistry. That is the distinction I am making. It is a national disgrace, from my point of view, that the men graduated from our standard high schools come to us with such defective education that we have to drill them in a knowledge

of their mother tongue so that they can express their thoughts clearly and precisely in the English language. Those of you who have looked into the educational statistics of this country have, I feel certain, been astounded at the wanton waste of time and waste of the taxpayers' money due to the irregular, imperfect, superficial methods of instruction that are characteristic of our preparatory school educational system, if by courtesy it may be called a system. It is the product of that system that is brought to the doors of the professional schools as the raw material out of which we are expected to make professional men.

Recognizing, then, these defects, it is proposed to compromise with the evil by patching up in our professional curriculum the bad job of the preparatory educational system. I think that it is immoral, it is compounding an educational felony, to do a thing like that. Let us attack our problem scientifically, and that means truly and fearlessly. If it is true that it is not possible for us to educate the raw material as it comes to us from the preparatory educational system into a satisfactory professional product, let us do one of two things:

First, use our influence to correct that defect in the preparatory educational system, or, Second, frankly admit that the high schools do not furnish sufficient educational preparation and for that reason increase our entrance requirements to a point where we do get enough. I regard that as the only logical mode of procedure.

I want to thank Dr. Owre for his very able presentation. But I want to go on record that while approving heartily and sincerely and in a most whole-souled manner Dr. Owre's point of view as to the necessity that is confronting us of so teaching our students that not only shall they be able to grasp the principles presented, but that they may get into their intellectual protoplasm the scientific attitude of mind toward their problems—that while that is the underlying, and essentially important thing, I must disagree in principle with his suggestion as to the cure of the difficulty of insufficient preparatory training unless we are to frankly say that we accept his remedy wholly and exclusively as a compromise measure in the hope of better things to come.

Dr. I. N. Broomell, Philadelphia

Since the conclusion of my college duties in an administrative way, I have given but little thought to the question of a curriculum for the coming four year dental course. I feel poorly fitted therefore to take a very extended part in the discussion of this paper.

The general subject as presented by Dr. Owre shows the master hand. Coming from one whose teaching environments are such that he may be said to be speaking from experience, we must recognize in this one feature alone a powerful and substantial argument in favor of what he says, notwithstanding the fact that the products of the curriculum described have yet to be tried out as members of the dental profession.

The time for argument in regard to the necessity for a four year dental course is past, but it is perhaps not too late to refer to the absurd comparison of this course to a five or six year medical course, which, if correctly proportioned with the dental course as to comparative field of operation and importance, should be twelve to fifteen years. The above would make it appear that I was opposed to the increase in the dental course, which is perfectly correct, and for this reason my interest in the paper just read is most profound. And, now that we have it, the all-absorbing question is, what shall we do with it?

I fully agree with Dr. Owre that "something has been wrong," and most heartily second his statement that "the old-time dentist has been found wanting and the modern dentist has been found out." I am also fully in accord with the idea that a reorganization is imperative, because there is ample evidence of this both in college training and office practice.

While the question of reorganization is of paramount importance and absolutely essential as a means of righting the recognized wrongs, I cannot agree with the essayist in all his suggestions in regard to *collateral training*, because it is not made clear that a knowledge of rhetoric, for example, is going to materially assist in the prevention or treatment of peri-apical infections, or that psychology is likely to exert any controlling influence over the prophylactic management or successful treatment of pyorrhea alveolaris. Thomson's statement that "It has often been from the most unpromising investigations that great practical discoveries have come," is a truism beyond a doubt, and may be applied to all branches of science, including dentistry. But at the same time is it not a fact that most men who become habituated to theorizing, frequently achieve but little in a practical way?

Personally I am not in favor of adding to the dental course as a direct part of the four years' work, such subjects as rhetoric, geometry, and possibly zoology. If these are ever to become a requirement leading to the degree of D. D. S., by all means have

them taken up and completed before admittance into the regular dental course.

Technical drawing, so far as it may be employed to assist the student to understand certain subjects belonging to the course, must be looked upon as a material aid; but why devote time to the fundamentals of geometry or drawing when these are already a part of the required four year high school course? Neither do I see the necessity of the dental student devoting time to making in detail working drawings of a hand piece. It would appear to be just about as consistent for the student in medicine to devote a certain proportion of his time to the working drawings of a pulmotor or a pair of obstetrical forceps, which they do not now do nor contemplate doing. It must be admitted, however, that pencil or pen and ink sketches accomplish much in the way of indelibly fixing in the student's mind certain features belonging to such subjects as general or special anatomy, microscopy, etc. The ability of students to draw is quite variable, and it may be for this reason that a specified course of instruction along this line is suggested for the freshman year. But it must be remembered that drawings for the purpose intended need not of necessity be works of art to serve their purpose.

The argument used in favor of including rhetoric in the ancillary list is that it would assist the student to more intelligently express himself, and the truthfulness of this cannot be denied. But why not let the high school rhetoric provide for this in a general way, the student devoting a part of the time allotted to this subject in the first year to familiarizing himself with technical terms and expressions. There is undoubtedly much room for improvement in the matter of the time devoted to and the methods employed in teaching the so-called medical subjects, anatomy, physiology, pathology, materia medica, therapeutics, etc., and no feature of Dr. Owre's paper impresses me more than his reference to this fact.

The somnolistic influence so much in evidence in the lecture-room, as compared to the intense interest shown in the laboratory, is a truthful comparison with which we are all quite familiar, and is descriptive of a condition which should by all means be overcome. There is but one way to bring about this improvement, and that is to increase the laboratory hours, permitting a considerable part of the additional year to be utilized in this way.

That a broader scientific foundation and a better technical training are indispensable needs of the future dentist, is an undisputed fact; that these requisites can best be attained by devoting

more time to the subjects at present included in the course, rather than by adding to the auxiliary list, would seem to be a logical conclusion.

Finally, is it not a fact that the dental graduate of the past few years feels that his incompetency in early practice is largely due to a lack of technical training while pursuing a college course so full of collateral subjects that little time was left for the essentials of successful practice? Why add to the confusion at this time? We now have an opportunity to remedy this serious defect in the dental college course; why not take advantage of it?

Dr. F. B. Moorehead, Chicago

Just so long as men live in an age of evolution will they disagree about certain educational methods. When the time arrives that men do not disagree, it will be because they have stopped growing and stopped thinking.

Dr. Owre has made some fundamental statements in his thesis. One of these was elaborated by Dr. Kirk in a very fine way. The fundamental question which we must face and answer in the premises is this: What is dentistry? What are the demands, in the light of the indictments of medical science, that are going to be made upon dentistry, and how nearly can the dentist of today meet the fundamental medical requirements that are before him at this very hour? We are not here for the purpose of placing a wreath of immortelles upon the past, or to bedeck the present with roses, but to look at this whole matter fairly and squarely. It goes without saying that our discussion is quite impersonal and in the abstract. In the first place, there must not be any less of intellect, of scientific attainment, of judgment, poise or usefulness on the part of the dental practitioner than on the part of any other medical specialist. You cannot take the mouth out of the body and place it to one side, depriving it of all its interdependencies, and assume that one type of specialist may take care of it, while another type of man shall be required to take care of another special part of the body. As a matter of fact, there are just as many correlations and interdependencies between the mouth and the whole body as may be found between the eye, ear, nose, throat and the body as a whole. The eye man, if he is a good eye man, must know general medicine, and the mouth man, if he is a good mouth man, must know general medicine. One may not deny the fact that there is perhaps in many respects a greater demand made upon the dentist than upon any other medical specialist, and yet we take a high

school graduate and in three years of training make a dentist out of him, while the man who was to be an eye specialist or an ear specialist much needs spend two full years in college preparation plus four years in medicine, plus at least one year in hospital interneship. Is it at all reasonable to assume that these two individuals shall have the same quality of intellect, or render the same quality of service? Certainly not! The dentist must suffer by comparison. When we have once defined dentistry, we shall be required to make a new prescription for the education of the dentist.

About the question of English. It probably will do little good to enter into any discussion of the subject here. Some men are academically opposed to the introduction of composition and rhetoric in the dental curriculum, and they have good reasons for their opposition. Other men believe that composition and rhetoric should be placed in the dental curriculum and they have fundamentally sound reasons for their belief. I think we should all be willing to give and take a bit during this transition period, and it certainly is not going to be a serious mistake to put rhetoric into the first year curriculum.

I think a serious mistake was made in changing to a four year curriculum, instead of requiring a year of college work for admission. In this year of required college work for admission, we might have placed zoology, English, composition and rhetoric, physics, general chemistry and qualitative analysis. Such a preparation would enable the student to undertake the dental curriculum with some degree of certainty.

It may not be complimentary to the high schools of the country to make the statement that, for the most part, our high school graduates are illy prepared to take up the study of dentistry. Certainly most uncomplimentary to state that after eight years of grammar school and four years of high school the average high school graduate is unable to express himself in the English language. Now, since these young men come to us, unable to express themselves in English, will it not, after all, be an advantage to give them five semester hours in compositon and rhetoric. One weakness in the high school curriculum is found in the stereotyped four year limit. Regardless of antecedents, home conditions, social contact, all are required or expected to mature and graduate at the same time. This, on the face of it, is ridiculous, but it is equally ridiculous to admit one hundred young men to a dental curriculum in 1917 and in 1921 assume that they are equally qualified to engage in the practice of dentistry.

We should admit students to our dental curriculum on the basis of minimum requirements, and admit them to advanced work as they are ready for it regardless of the time limit. While a minimum time limit may be established by law, it should have no specific bearing on the student's development and fitness to be credentialed to enter into practice. We should discourage, as early as possible, certain students. As soon as it may be determined that one is not qualified to continue his course in dentistry, he should be required to leave the curriculum. Those that remain should receive every possible encouragement, and should be credentialed by the University, not because of time requirements, but principally because of fitness. We should not limit our admission to degrees to once a year, but should give degrees to students as soon as they are ready to meet the requirements. Our curriculum should be elastic, and we should have much more in the way of elective courses. The University of Chicago has for several years conducted, with great success, an elective system, both in the department of Arts and Science and in the professional schools as well. They graduate men and women four times a year. At the University of Illinois, at a recent meeting of the Board of Trustees, the same principle was adopted for the Arts and Science department, and we hope it may not be long until the professional schools may have the same system.

Something has been said here about the introduction of zoology into the dental curriculum. I cannot understand how any man, who has any knowledge at all of zoology, can take any exception to its place in our curriculum. In the zoology course, the student, in the first place, comes into familiar contact with the cell—the basic element in biology; he familiarizes himself with microscopic technic, and the preparation of tissue. He is inducted into the science of embryology, and finally receives a fine type of instruction in comparative anatomy.

At a glance, it must be apparent that this course in zoology is only a reasonable preparation for the study of histology, gross anatomy, bacteriology, pathology, and physiology.

I think we shall discover before we have gone very far in the four year curriculum, that the high school graduate is really not prepared either mentally or physically to enter upon a serious difficult four year college course as represented in the dental curriculum.

During this experimental stage, I think we shall have to give and take, and be willing to admit that in the hands of one man one

course may be effective, while in the hands of another man another course may be effective. The personal equation after all is the fundamental factor in any education process. I think we shall all be big enough to allow certain freedom if for no other purpose than that we may test out our theories. Personally, I have no doubt about the value of the type of instruction Dr. Owre has brought to your attention. Because I cannot see quite like the other man, does not mean that I am crosseyed, or that the other man is blind. While all compromises are basically wrong, I think that in this particular period in the development of dental education, we shall have to assume that there may be sufficient reason for more than one type of curriculum, assuming that in the final analysis, the thing that is worth while will live, and the thing that is not worth while will be relegated to the scrap heap.

I think that if one will read between the lines and catch the spirit of Dr. Owre's paper, lay aside his personal prejudice, keep his mind open to conviction, and have a broad human sympathy, as time goes on he will come to the conclusion that his premises are fundamentally right. You may differ with him about certain details, but I really think he is academically correct.

Dr. T. W. Brophy, Chicago

It seems that this is just a continuation of the discussion that took place in Minneapolis last year. I have always been opposed to the dental colleges doing academic work. I believe wholly with Dr. Kirk that students should be educated before he matriculates in a dental college. I do not think it will be wise for us to devote a part of the precious time of our four year course, or the first year of it, to doing that kind of work which the students should have done before they entered.

This whole discussion today and a year ago resolves itself into an arraignment of the educational institutions of our country with the charge that they have not been thorough in their work, the charge that the high school graduate has not come up to the standard that the curriculum would indicate, that the high school has not done its work well. And those of us who have looked into the question of the high school curriculum and high school work know that that is true.

In the city of Chicago we have an Association of Dental College Faculties of the three schools located there. We get together and read and discuss papers and profit by that work. Early last spring we had a meeting that was memorable. A paper was read by myself and discussed by the members of the different faculties. We had

present with us the Superintendent of Schools of the city of Chicago, the Dean of one of the colleges of law of that city, and a number of men and women engaged in general educational work. And during that discussion, this fact was disclosed by the law school Dean: That the curriculum of the high school provided for everything else, something like fourteen different vocations, but excluded medicine, law, and dentistry; no provision was made in the course of study for these professions. In other words, no special course of study was laid down in the high school curriculum for students preparing for these professions, and as regards the type of study given in the high schools of Chicago, and I believe the same condi- exists everywhere, it was further disclosed that the high school course is elective, a very unwise thing. The student does not know what he needs to learn. And the teachers, the general board of education if you please, permit him to select those branches which he specially desires to study. What is the outcome of that sort of thing? It is a good deal the same as it would be in a school of medicine or dentistry provided the course were made elective—the student picks out the branches he can get the easiest, learns those things, leaves out the others, and is graduated. What happens? Almost everything in that high school course that is the most essential for the student to learn, and that which one would expect him to know in order that he might take up intelligently the study of a profession, he omits. Included in the high school curriculum are courses in biology and in advanced studies, but he does not take them because he can get the others easier. So when he comes to us we are disappointed, and I expect it is that sort of thing which first influenced these gentlemen to advocate the taking of academic work in our professional schools. We know that our students should have it—I agree absolutely with Dr. Owre that the student should have these subjects. But the question is where he should have them. In my opinion we should see that he acquires those branches before he comes to us. We should not have him devote a single year to this study, for that throws our work back into a three year course. If we include in the dental curriculum any of the academic work, we might take up all these branches; we might have a spelling-school to teach our students how to spell, and doubtless this would be a good thing. They need it. When they write an examination paper we do not want them to spell pus, "puss," as they do sometimes, and various other things in the same way. Therefore if in the dental school you are going into the giving of academic work and have other things part of the year, take up the spelling-book and have them learn to spell. That would be good for them all through life. No!

Now what is going to happen? Mr. Shoop, Superintendent of Schools in Chicago, is President of the Association of High Schools of the United States. In February, as President of that Association he will deliver the annual address to the general body meeting in the city of Denver. At the meeting of the Chicago dental faculties, to which I have referred, we brought to the attention of Mr. Shoop the fact that the high school graduate was a disappointment; that we had looked forward to the days when we should have high school requirements for entrance, when our students would be educated men but that we had found they were far short of our expectations; that experience had shown that in many instances the average high school graduate was not as good a man in our course as many students who had never attended high school and had received special examination because they did not possess the necessary entrance requirements. As a result of that conference, the Superintendent of the Chicago Public Schools is going to read a paper at the meeting in Denver, and his theme will be the preparation of students of the different schools for professional life. And when that has been done, and when the representatives of the various states shall have reached the conclusion that they must reform their methods, that they must either change the course of study or insist upon their students taking the courses that will fundamentally prepare them for professional life, then in a few years hence we will not have to spend our time discussing a subject like this. It may be that, for the want of something better, as has been so tersely stated by Dr. Kirk, we will have to patch up something and provide for the shortcomings of the high schools. We say to the educational boards of the country—We have to do the work you should have done before you sent us the student. We may have to do that to a certain extent, but the less of it we have to do the better for the courses of dental education. We must have it, but we must insist that the public schools of this country, which are using the money of the people, shall do the kind of work that will prepare the young men and women who enter our schools to go on with their work without being obliged to spend our time in teaching them the A-B-C's of English.

Dr. Joseph Nolin, Montreal

Exception has been taken to some of the suggestions made by the essayist, and with one of these exceptions I wish to take issue. Dr. Kirk, I think, affirmed that drawing should not be, as suggested by the essayist, included in a dental curriculum, but should be taught to the student before he reaches the professional school. The essayist and Dr. Kirk have very ably

defined *Science;* but it has been acknowledged by both that Art, as well as Science, is an essential part of dentistry. But what is Art? Art might be defined: A clear conception of form and color. It cannot, I am sure, be denied by any one that a clear conception of form and color is absolutely essential to the dentist. Can a boy during his high school or elementary school course, learn enough about form and color to be an artist?—such as a dentist should be? Is his mind developed to the extent of having acquired such a sense of proportion and direction as will enable him to carve and mold—not plaster of Paris, nor marble, nor clay—but the living human flesh; as he will be called upon to do for the rest of his professional life? Mr. Chairman, I believe not. If it were so, why should not also the sculptor have learned enough about drawing during his high school course to keep him from going to Paris to study for ten years or more? Why should not the painter have learned enough about color to enable him to dispense with going to Europe to learn from the great masters? Not only to my mind is the essayist right in saying that drawing, as applied to dentistry, should be taught to the student in the dental college, but, in my opinion, Dean Owre has not gone far enough. He suggests that we should teach our students a certain amount of *mechanical* drawing. As Dr. Kirk has very properly said: "Science is inexorably exact. In Science two and two cannot make more nor less than four." But when it comes to Art, a clear conception of direction and proportion and color is so essential that unless one has acquired it, one is at a loss to know where two and two begin to make exactly four. It is only by a long and tedious training of the eye and of the mind that a man can get a sufficient knowledge of form to be able to recognize the defects and the esthetic possibilities of the human face. The sculptor who carves in marble a face at rest will endeavor to chrystalize on it some fugitive expressions of the mind. It takes him twenty years before he becomes able to do it, but, if he succeeds, his name is immortalized. We give our young men the *human face* to deal with, in orthodontia, in prosthetic dentistry—the mobile, restless, ever changing human face and, without any preparation of their mind, of their eyes, not to speak of their hands, we expect them to do better than the sculptor or the painter. No dental curriculum can be said to be complete without a thorough course in free hand drawing and facial morphology.

Dr. H. M. Semans, Columbus

As I do not wish to enter into an extended discussion of this admirable paper, I would simply say that my views are in accord with those expressed by Dr. Nolin.

Dr. H. E. Friesell, Pittsburgh

There is not much that I can add to the discussion of this paper. I like to hear both sides of a case presented as we have had opportunity to do this morning, and I feel that, irrespective of the force of either argument, the important thing is that we are to have a chance to try it out ourselves and prove whether it is right or wrong, whether or not we should teach this, that, or the other thing to a student who has not had it, and who we recognize needs it. That which confronts us is not a question of theory, it is a fact, it is a condition we have to meet. If a man comes to us without certain important preparation, which he should have, we seem to be the ones who are required to give it to him.

Dr. Brophy: Send him back.

Dr. Friesell: What is the use of sending him back?

Dr. Brophy: To get it.

Dr. Friesell: He did not get it before, why expect him to get it by repeating the dose?

You cannot expect the dental schools of the country to exert very much influence upon the high school or secondary school education of this country, when for years the university teachers have been trying to influence secondary education and they have not succeeded to any very satisfactory extent. And furthermore, you have to go back further than the secondary school. When you permit the high schools to be controlled and managed by a lot of politicians who know little and care less about education, you cannot expect to get ideal results. When you go to a school to arrange for a dental clinic and have to hunt for the directors of that school in a pool-room or saloon, and you find that the majority of them belong to that element, you wonder that you do not get worse results in preliminary education.

The question is this: So many children are being born in this country every year; the state says that these children must have a certain education, and certain prescribed officers of the state provide the means and the machinery for that education; there are so many desks and so many seats in a room, and when those seats are full other children cannot get in; when the others are ready to come into room No. 1 you have to put the first in room No. 2, and once in a while you have to skip a room if children are born faster than the equipment with which to take care of them is increased. And that goes on right up to the high school.

The answer to the problem is, then, let in the material we have. Years ago if you wanted yellow pine and the mills sold you yellow pine with a knot in it you became indignant and sent the material back; but you don't do that now, you are glad to get yellow pine if it is full of knots. So in the dental schools we have to take the material as it comes to our hands, and it is up to us to show whether we have any right to be in the teaching business. We take this material and make the best that can be made out of it, and if we do that I think we are entitled to some commendation.

The principal thing in this matter, to my mind, is that after all these years of discussion pro and con—after twelve to sixteen years—the four year course has been adopted and we shall have opportunity to see what we can accomplish in an adequate period of time, for which I am certainly thankful.

Dr. A. H. Hipple, Omaha

A few years ago, in a crisis, the then President of the United States said: "We are confronted with a condition and not a theory." As teachers representing dental schools, we are confronted with a condition and not a theory. We all know that less than a year ago a certain great and authoritative body representing the National Dental Association, the Association of Dental Examiners, and the National Association of Dental Faculties, prescribed for us a course of study, and they said to us—You cannot be classed as an "A" school unless you teach certain subjects for a certain number of hours. That has not as yet been referred to here, but it seems to me it is worthy of some consideration. Every man here would like to have *his* school classed as an "A" school. And if the fiat of that body means anything, it means that it will not be an "A" school unless English is taught for a certain number of hours. What are we going to do about it? Personally, I think perhaps this body would be better qualified to say what should be the curriculum of a dental school, but the fact is that that has been already prescribed. And the unfortunate thing in my judgment is that the fiat of that body applies to every school from the Atlantic to the Pacific and from the Gulf of Mexico to the Great Lakes. Regardless of local conditions, regardless of the teaching in the high schools, regardless of local requirements of entrance, the same requirements are laid down.

In the city of Omaha the High School allows a student to carry only four subjects. He has to have special permission to carry more than four. But every student must take English for four years. My friend Dr. Brophy may be right when he says that in Illinois

some men who never saw the inside of a high school make better students than those that are high school graduates, but this is not true in Nebraska. Out there we find that men who had four years of English in the Omaha High School do know how to express themselves, and we think they do not need English in their dental course as much as they need some other things.

In contrast to that, while spending a couple of weeks in Ontario I found that in the high schools of Ontario some students are carrying from twelve to fifteen subjects, are reciting on them and passing examinations on them. Is the educational system in Ontario a failure? They don't think so up there—they think it is a success. Is the educational system in Omaha a failure? We don't think so out there, we think it is a success. But we do think that it is a mistake to say to every dental school throughout this country, regardless of local conditions, that they must teach certain subjects for a certain number of hours or pay the penalty of being classed as an inferior school.

Now, I think that we should not be so deeply concerned about the number of hours our schools devote to the teaching of English. The question is, what is the very best we can do for the students that come to us? Let us establish minimum requirements, let us insist that every student must be graduated from a high school, let us do away with all entrance examinations, which we can do if every student takes a prescribed high school course, and then do the very best we can for him while he is under our care.

Dr. Owre,
(Closing the discussion)

I am not going to call attention to all the little items I have jotted down. During the discussion I was much impressed with the fact that we are trying to arrive at some unity and common aim, to reach some point from which we can all radiate and then present the results.

Some forty or fifty years ago a critic in England, Matthew Arnold, was appointed minister of education, I believe the position was called; at least it had a great deal to do with the educational program of Great Britain. To my mind the main lesson that we can get from Matthew Arnold's writings is that we now, like the English in his time, must re-orientate, have a readjustment of our entire educational scheme. One of the first requirements for such re-orientation is this: That we set a higher self versus a lower self to rule in this matter. In other words, we must make the matter wholly objective.

Take a small item like English: We discuss it and make a great mountain out of it. This is placing the emphasis wholly wrong. As a matter of hours, out of 4,800 hours what does the course in English amount to? Only a very small part. And technical drawing—what does it amount to?

But let us go at it from another standpoint. Let us go beyond the trivial and make a diagnosis of the country. We must examine this country's institutions, its social and economic conditions, its religious institutions, the relation of the individual to the state, before we begin to do anything. Then we must adjust ourselves to the conditions as they are; not compromising too much, of course, but to some extent nevertheless, because we are not all martyrs, you know. There is one thing I want to call to your attention in that regard: This is an individualistic country. We believe in the rights of the individual to express himself, we have not yet substituted that great social idea of letting the higher self rule—now, have we? How is it possible for us to set up a program based upon the highest ideals? We cannot do it yet, and we recognize that. This is the reason why a social leader such as President Vincent, who is now to function in a larger capacity, was able to introduce an idea made possible the formulation of the document known as the Chicago resolution. In it is recognized the character of the institutional life of this country. It gives us all the leeway we want for the expression of this individuality.

Let us accept this; then we will have a verdict in a few years from now. I look forward optimistically to the day ten years hence when we shall be able to measure the results not only in technical terms, but in large human terms, because I feel, keenly and acutely, that at the present time this Institute is challenged, every institution in it is challenged. As Provost Smith said this morning, we are superficial; but there will yet be an expression of the larger social self in this country to a greater degree than ever before. Perhaps in a year or so we shall see what this whole matter of education as related to our country means. Meanwhile we must readjust our program of education. Hardly ever does a body of dentists meet but we hear some reference to the commercialization of our profession; it is a dangerous condition, and yet when some small item is introduced which might operate unconsciously in eliminating some of the commercial features, we raise a great objection to it. And it is such a small item! I want to stand for something grander than that. I want to ask in considering the possibilities of a program, what we can do with it when we substitute that higher self, giving

it that larger spiritual interpretation and standing for a unity of purpose, a common aim. And if we have to wait ten years, then let us be big enough by that time to incorporate into the program thereafter a grander social consideration.

THE HARMONIZING OF THE FOUR YEAR COURSE IN DENTISTRY.

FRED W. GETHRO, D. D. S.

The subject of this paper is quite alluring for anything dealing with harmony for a goal is likely to spur one on to making great efforts. While the subject is enticing and timely it is, nevertheless, very deceiving for the writer found many of the schools were not prepared to submit schedules. Realizing that many of the school faculties were studying and working on the four year schedule and needed all the time available, I waited as long as possible before requesting the schedule. The following letter was addressed to all the deans of the forty-eight schools:

My dear Dr. ————.

I am preparing a report on the "Harmonization of the Four Year Course" for the meeting of the American Institute of Dental Teachers. Will you be good enough to help me by sending a catalogue of your proposed schedule and any other information relative to this course?

Assuring you of my appreciation for your assistance, I am,

Yours very truly,

Out of forty-eight schools written to, I received forty-two replies which is very gratifying for there are undoubtedly some good excuses why a few of the six did not answer. Out of the forty-two replies, twenty had made sufficient progress with their four year course to send a schedule. A great many are waiting on the result of the deliberation of this body at this meeting before deciding upon a schedule for their four year course. Out of the twenty schedules received, only fourteen had the schedules reduced to an hour basis so that one could accurately estimate just what was contemplated. These fourteen are in such complete shape that we may well spend some time making some accurate deductions, comparisons and criticisms. I trust no one will think that anything that may appear like criticism in this paper is meant in any but

the kindliest way. We should all invite criticism. Personally, if you will give me some constructive criticism to the schedule of the school with which I am connected or if you will make it personal and criticise the particular subject I am teaching, I will very much appreciate it for I want to know the weak points. I want to improve the course and the more criticism you can offer, the better I will be pleased. I will do my best to gain something from every criticism offered.

It is undoubtedly true that some of the schedules are not properly balanced for we can readily see that one school cannot possibly teach an important subject in twenty per cent of the hours that other schools require, neither can another school consume five times as many hours on a given subject unless it is done at the expense of some other equally important subject. The hours as given in the accompanying chart may not be correct but they are correct so far as one can estimate them from the schedules. Some of the schedules are so obscure that it is quite impossible to decipher them. One school gives a course on "Elements of Operative Dentistry," another on "Preventive Dentistry," another on "Clinical Dentistry," another on "Clinical Technic." The question may well be asked—What do they mean?

By consulting the chart we find that one school teaches chemistry in the third year, one teaches physical diagnosis in the fourth year, another teaches neurology in the fourth year, and another has a course in commercial law in the fourth year.

If we will look at prosthetic dentistry in the freshman year, we will note that our school devotes eighty hours and another four hundred and fifty. Both cannot be correct in their schedules. I cannot believe that any one subject in the first year should receive forty per cent of the total hours. It cannot be done unless it is accomplished at the expense of other possibly more important basic subjects.

It so happens that all the schools that teach the taking of X-Ray pictures in the junior year call the subject radiography and all who teach it in the senior year term it radiology. Should we follow in the footsteps of the medical profession and add a fifth year to our course, I do not know what this subject might be termed in the final year.

I am glad to note some very evident traces of harmonization in some of the courses. Dental anatomy is taught in most of the

schools during the first year. Only one of the schools teaches dental anatomy in the second year, this school evidently dividing dental anatomy between the first and second years. However, it would seem to the writer that better results might be obtained by giving the entire subject in the first year. You will note that one school devotes 256 hours to this subject in the first year. This represents almost twenty-five per cent of a student's hours in the first year and it would seem that this amount of time could only be given at the expense of some other equally important subject.

It is interesting to note that one subject taught by seven schools in the first year is the only one where all have scheduled the same number of hours—ninety-six. There is certainly perfect harmony in this particular subject so far as these seven schools are concerned. The subject is English.

Note: (At this place the writer used large charts that could be seen from all parts of the room to illustrate the points made).

The charts accompanying this article were made from the originals used at the meeting. A study of these charts will reveal some startling information. (See charts pages 209-212.)

Some illustrations:

Chemistry is taught in 19 schools in the first year.

Chemistry is taught in 19 schools in the second year.

Chemistry is taught in only one school in the third year. (128 hours.)

In the first year one school teaches 876 hours.

In the first year another school teaches 1,320 hours, more than 50% increase in hours. Both can hardly be correct.

Several schools have scheduled over 1,400 hours for the year. We may well ask the question—Is it possible to carry out such a schedule? Only two schools out of twenty teach Dental Histology in the third year.

Exodontia is only taught by three schools.

Physics is taught by one school in the third year.

Dietetics is only taught by one school.

Neurology is only taught by one school.

One school teaches Oral Surgery in the second year.

Prosthetic technics is not taught by five schools during the first year yet one school devotes 320 hours to this subject, another 400 hours, and another 450 hours—all in the first year.

The following twelve subjects are only taught by one of the twenty schools as first year subjects.

Com. Dental Anatomy.
Embryology.
Mathematics.
Com. Anatomy.
Hygiene (60 hours).
Materia Medica.
Morphology.
Dental Technics.
Pathology.
Electricity.
Military Science and Tactics.
Bacteriology (120 hours).
Are these first year subjects?

I could continue these illustrations for some time but I am sure it is unnecessary. I leave it for your discussion. Is it not very evident that we need "Harmonization"?

DISCUSSION.

Dr. S. H. Guilford, Philadelphia

I cannot properly discuss this paper tonight for two reasons: One is that I did not receive a copy of it and had no idea how the essayist was going to treat his subject until I came into the room and the lecture had begun. The second reason is that I don't think any one is qualified to discuss a paper of this kind unless he has had opportunity to look over the tables which have been compiled, study them and arrive at same definite conclusion in regard to the questions involved. A subject of this character must be considered deliberately and carefully and we must have all the data before us in order to discuss it intelligently. But it is well to have the subject, which is a broad and important one, presented, and we must continue to consider it from this time on.

In regard to harmonizing the course, I don't exactly see how we are going to accomplish it, and since inspecting the tables it seems less probable than before. The different schools are so wide apart in their ideas and in the amount of time which they deem should be given to the various subjects that it seems almost a hopeless task

to try and get together. In any event I do not think we will accomplish much inside of several years. The whole matter is in a tentative stage, and each school will have to arrange its course for itself and then at the end of the first year see what changes should be made, and at the end of the second, third and fourth years, etc., the same. Regarding the total amount of time to be devoted to the entire course there will be more unanimity.

The ideal condition would be for the dental schools to have their courses in the various subjects at the same time and at the same period, so that if for some reason a student found it advisable to transfer from one school to another he could do so on an equal basis. Nowadays we have all kinds of confusion because the schools have different standards as applied to the various studies.

I would like to say something in regard to the fundamental or so-called ancillary subjects. I agree perfectly with some of the speakers who voice the sentiment that the matter of preliminary education must be taken care of by the elementary schools themselves. We cannot do it. A professional school should not be asked to teach those branches which ought to be studied in the preparatory schools. We have a difficult matter before us. We are obliged to accept those candidates who come to us with a state certificate, high school diploma, etc., and there is nothing to prevent their entering upon our courses of study. But when we find that a man's training has been so poor that he is not properly qualified to enter a professional school what shall we do about it? All those who are teachers and go over examination papers will understand exactly what I am referring to. Sometimes a student comes to us with the highest qualifications as far as preliminary education is concerned, and yet is absolutely ignorant of his own language; does not know how to spell, how to punctuate, or how to frame sentences. In fact, the spelling often is so bad that I am reminded of a gentleman who said that if *damn* were spelled *dam*, as many students would spell it with two m's as with one.

Two years ago Dr. Owre presented a paper setting forth a certain arrangement of subjects, and I notice that Dr. Gethro's paper follows along the same line to a certain extent. For instance, we have here, among other things, animal biology; I don't quite understand what that means. To a certain extent all biology is animal unless it pertains to vegetable life. But biology, of course, in itself is a fundamental study. Then we have English and rhetoric. We cannot teach English and rhetoric, we have not the time, it is not

our function, and if the preliminary schools do not do this it certainly is not in our province to do it.

Then again, we have technical drawing put down as a separate subject. With us, technical drawing consists in the student drawing the specimens that are placed before him. In other words, he must take a specimen and make a drawing of it; he must, by means of his pencil or pen, represent that specimen upon paper. I do not see why technical drawing should be made a separate subject, because it is now taught under dental anatomy, bacteriology, histology, biology, etc.; drawings are also made from microscopical sections. I do not see any use in teaching a student to draw outside subjects when he can spend his time more profitably in drawing objects with which he needs to be familiar. In the exhibit-room I saw mechanical drawings drawn to a scale. What good is that going to do our students? It seems to me this time should be spent in delineating those things which he will actually use. He wants to know the anatomy of the teeth and of other structures, and we have him fix that upon his mind, not simply by looking through the microscope, but by drawing the specimen he has observed and delineating it upon paper.

It is stated here (referring to chart) "Physics or technical drawing." Physics is a fundamental subject and is important; and it should be taught, as is indicated, in the first year.

Another thing we find listed on this table is psychology. What business is it of ours to have our students study psychology? We would like them to know a lot about this subject, but it is not our province to teach it. And so it is with economics: I do not see why we should devote our time to this. Then we find jurisprudence listed but there is no good reason why we should make this a required subject of study. In our school, lectures are given upon this subject, and the students get as much knowledge in regard to it as they can properly take in.

One matter that should be mentioned is hygiene. In this paper the word does not appear at all, but if there is a subject that will take the place of it I do not know what it is. General hygiene should first be presented, then dental hygiene. The subject is very important and should be gone into carefully and somewhat extensively.

Prosthetic work. The hours to be devoted to prosthetic technic are very good. The numbers are 190 to 192. In many cases however I think a great deal more time is given than that. Prosthesis is

carried through the first, second and third years, and operative technics is carried through the third and fourth years. Most of our schools have been teaching operative technic and prosthetic technic either through the first year or the second year, or through both years, in that way getting at it early, and it is well to have it so.

As to operative dentistry, it is early enough to take this up in the junior year, and we have here lectures and recitations amounting to just one lecture a week. I do not know any professor of operative dentistry who gives as little time as that, but I do know of a course in which two lectures a week are given for 32 weeks, or 64 lectures. Operative dentistry is most important to us. Prosthesis is very important, but operative dentistry concerns our work as we do it at the chair, and it is so important because of the demand upon the dentist for that kind of work. We all believe in higher education, we believe in having fundamental education, and then having that advanced as far as possible. But while reaching up for the ideal and trying to secure for our students all possible benefits to prepare them for actual work, we must not forget that the manipulative part, learned at the chair, should be given a greater amount of attention. It seems to me that after having laid the foundation in the freshman year and carried this work along during the first half of the junior year, the student ought to do minor work in the infirmary, give prophylactic treatments, etc., and then during the junior and senior years he should be at the chair as much as possible. In operative work it is not what the student learns at the lectures which is of the greatest benefit, it is what he gets in actual experience upon the patient. The patient comes to us for manipulative work, and in order that the student may learn to do this properly we need to devote much more time to it.

In the schedule as it is to be arranged finally I think we should devote more time to the operative work, to the work at the chair, than anything else. What was it that produced the good operators and dentists of many years ago? Was it the didactic instruction they received in the colleges? We laugh at that instruction now, it was so limited and so simple in character. It was not that, it was the manipulative dexterity acquired at the chair, not only while in college, but afterwards.

This subject is so large that we cannot cover it in a brief talk. I desire to emphasize, however, that we want to give more time to the work at the chair, to operative dentistry in its broadest sense, and then as much time to the other subjects as we can possibly devote to them.

Dr. Gethro: I want to apologize to the members who are to discuss my report for not furnishing them with an advance copy. There could be no report until the charts were finished and the charts were not completed until just before coming to the present session. Some of the material in these charts was given me today—hence the delay in writing the report.

Dr. J. H. Kennerly, St. Louis

I am of the same opinion as that expressed by Dr. Guilford. Neither am I in a position to discuss this paper. I have been wondering for some days what was the matter with my friend Gethro that he did not let me know what he was going to write about, but as soon as I saw him come in here with his arms full of charts I was answered. I knew his habit of putting things in figures and was familiar with the saying that "Figures do not lie," but I am going to say right now that in this case either the figures do or Dr. Gethro does, because he says here that the institution I represent does not teach histology at all. The synopsis I sent to him showed that we taught histology 128 hours. If you will place the 128 hours credited on the chart to metallurgy to the credit of histology and put 32 hours in the metallurgy column, it will be right. But I do not blame Dr. Gethro as he had too much to do after five o'clock.

Another thing that seems to confuse Dr. Gethro is the fact that the schools teach so many subjects. If you will sift those subjects down you can eliminate about nine, which will reduce the number of subjects to twenty, because the difference is in name only. One teacher calls his subject dental medicine, another calls it dental materia medica or materia medica, which we class as the same. It is only a difference in nomenclature and not an accumulation of subjects.

I became interested in the four year curriculum some time ago and I want to say to you that I have devoted a great deal of time to working out what we have presented as shown on these charts and I do not see how, under existing conditions, we can make them different. I cannot always say what should be done in the institution I represent. The institution itself is larger than any man or any department, and certain of these subjects must be taught at certain times and in certain places as designated by the Committee on Curriculum. Our freshman curriculum shows 1008 hours, the sophomore, junior and senior years show practically 1400 hours.

At Minneapolis last year we adopted a four year curriculum; in other words, we adopted the Chicago resolution which called for 4800 hours. Certain state boards have in correspondence and otherwise made the statement that if any dental school in the country expects to teach a course of 4400 hours when they agreed to teach 4800 hours that our graduates would not be permitted to pass state boards. Consequently, in arranging a four year curriculum that we could handle to best advantage, and believing that certain institutions and especially state boards would criticize our so-called ancillary subjects, we are prepared to show more than 4800 hours of actual teaching in dentistry. In other words, we have 4800 hours of actual dental teaching, with 350 hours added in which we believe we should be permitted to teach any other subjects which we may deem necessary and see fit to teach. For instance, of that time we propose to consume 98 hours in teaching college English, a certain number of hours in teaching drawing, both of which we believe will add to the accomplishment of the student and while they may be considered ancillary, they are certainly beneficial. It has been stated here several times this afternoon that these things should be taught in the preparatory schools and I agree with the proposition. You will also agree with me when I say that these branches are not taught in the preparatory school and if we have the time at our disposal, we claim the right to teach them to our students and can still certify to any board in the country that we have taught more than 4800 hours of actual dentistry. I do not believe that any board has the right to dictate to any school what subjects should be taught in the separate years, this is a matter which must be controlled by the authorities educating the student.

Dr. Guilford stated that he wanted all the time he could get for practical work. By reference to our schedule, I find we have 1,712 hours for practical work, 640 hours in the junior year and 1,072 hours in the senior year. Now, it is a fact that in the three year curriculum, as it is taught today, we are teaching very near 4,400 hours and under the new curriculum we are going to teach 5,184 hours. That is based on: the first year, total number of hours 1,024, which divided by 32 gives the number of hours taught during each week. During the remaining three years the time is based on 44 hours per week, that means five and one-half days of eight hours each.

My criticism is that the whole course is too big; that eight hours is too much time for the student to spend in the class and lecture room. But my experience, which has been of some duration,

teaches me that unless we keep these young men pretty busy we do not get very much done, and the consequence is that practically everybody seems disposed to load the student up pretty heavily so that he will be sure to accomplish something.

Dr. H. M. Semans, Columbus

Two or three things in these well-worked out charts have come up that I want to speak about. It is interesting to note the great differences exhibited here in the four year courses. As perhaps most of you will remember, six years ago we had some discussion about a word we are still using in the Institute, namely, "standardization." And for two or three years we harped upon that pretty hard, and one of the things we decided to standardize was our three year curricula. As I remember, this was at the time that Dr. Friesell was President, and I took it upon myself to consult the schedule cards of all the colleges so far as I could get hold of them and compare the three year course as presented in the various schools. I succeeded in securing twenty of these cards. At that time, 1911-12, we had something like twenty years in which to round out and standardize and bring together our three year course. Well, did we? No, we did not! That three year course is just as bad as what we are having shown to us tonight, every bit, and in the proceedings of the Institute you will find where reference was made to this fact. Last year, desiring to bring up the subject in my address, I went way back in the Institute proceedings. One thing I like to do is to look back in the proceedings, because by such reference one may find that we are doing again what we have done before, only with perhaps a little more insight into the matter. And so last year I called attention to the very wide discrepancy shown in the curricula of the three year courses back in 1902, when we wanted to go to four years, and again in 1914. There were no two colleges alike or anywhere near alike. That is a broad statement, but so far as my investigation went it was true. So it does look as though the attempt to standardize according to an average broader service in the various subjects will be a mighty hard proposition to carry out if we could not do it in our three year courses.

I wish to take exception to one thing brought up both tonight and this afternoon, and discussed at previous meetings, and that is about high school work. I would like to go on record as saying that our high schools are not as bum and bad as we sometimes make them out to be. When we talk about high school students not having good courses in English, it is not so, they do, most of the

three or four year courses are good. High school pupils are immature children, young people from 14 to 18 years old, and the subjects that are given in the high schools are, without a single exception, repeated in the arts and science college courses. In other words, we are receiving from the high schools an immature subject, with whom an attempt has been made to start at 14, for instance in English, giving him a four year course in it. He then, in the regular college course, takes again a two to four year course in English; physics the same way; chemistry the same way; and various courses in history the same way; an advanced course in mathematics, I grant, an advanced course perhaps in Latin and Greek. And yet there is not so very much difference.

This simply means that we as dental college teachers are receiving the immature mind from the high school, that is all; so we add a fourth year. Why? Because of the need of that fourth year; I do not much care what you do with it. I know and you know what we individually will do with it for sometime to come, I know what our faculty will try to do with it. But the fourth year we are adding is going to be worth a great deal more than just one year added to three years. The adding on of the fourth year is going to give us a young man or young woman that is matured a great deal more in proportion than one year's time would indicate.

Another thing: We notice here, and I have noticed it in the Institute proceedings, a broad discrepancy between the minimum and the maximum hours of the various courses. This has been going on all the time. In our discussion in the past we have noticed this: Each teacher wants to give a certain number of hours and he feels that his subject is important, he believes that he is giving in his course a good average, but his idea of a good average is away above that of the general average of that course. In our school last year we made out a rough schedule, and it ran over 6,000 hours in the four years because the executive committee of our school had received from each teacher a specification of what he desired to give in his course in the four year curriculum.

Dr. F. C. Waite, Cleveland

I sympathize with Dr. Gethro in the work involved in the preparation of this paper, because I have been through the same thing in the Association of American Medical Colleges, and I know the difficulties to be met in getting the data together.

I would like to say something in regard to the ancillary subjects of chemistry and biology. We have heard a great deal about the insufficiency of high schools in the preparation of students for advanced courses. Granted that is true, or granted it is not true; perhaps you are familiar with the facts that in a good many places we find it necessary to errect buildings on quicksand. We can do this by putting in proper footing stones. It seems to me that physics, chemistry and biology in the four year curriculum comprise footing-stones for the structure of dental education, and if we make the foundations firm and efficient we can put any structure on it and it will stand.

The thing, then, to be thought of is to give those fundamental courses thoroughly well and to have experienced teachers in them. The medical schools have just been through a similar experience regarding preparatory training. Some schools put in their own preparatory year and appointed inexperienced teachers to give physics, biology and chemistry, with a result that was not good. Thoroughly experienced teachers are needed for these subjects.

Just one more word. After an experience of twenty-five years during which I have devoted all my time to biological subjects, I am convinced that the keynote was expressed this morning by Provost Smith when he said that what we do in the fundamental subjects is superficial. I believe that biological teaching in general in our schools is superficial, that we are too likely to try to make of the course a menagerie and have the students see a great many forms, rather than to have them spend their time on a comparatively few forms and get the principles of biology from those few forms. In the biology for dental students it is easy to choose the things that will lead up to those principles that will be of interest in the special field of dentistry. In each class of the animal kingdom we can secure for study species which will show calcareous secretions and from which can be demonstrated the principle of the deposition of calcareous salts in a manner similar to the process seen in human teeth. Such forms can be used for the biology course to dental students. Thus he will learn that secretion of calcareous salts is a common process in biological economy. In this way a course in biology can be planned by a well trained man that will logically lead up to the subjects that come later in the dental school curriculum.

Dr. Arthur D. Black, Chicago

I wish to make only one suggestion in connection with this paper. I would dislike very much to have the subject discontinued at this point without our getting a little more out of the presentation than possibly has so far been the case.

Dr. Semans has called attention to the fact that five or six years ago the three year course was in just as bad a mess as this four year course appears to be today, and I think that is correct. However, the fact that the large majority of the schools have not yet begun to teach the four year course, presents a better opportunity for us to get a little bit closer together between now and next fall than would be possible next year. I suggest that these charts be left upon the wall during tomorrow at least, in order that those who care to do so may copy some data from them.

It is more important to get together on the freshman course than on the others, for the reason that the freshman course is the only one which will be in operation next year. These figures are not quite so far apart as a cursory glance at the charts would indicate; the apparent difference is in part due to the nomenclature that is used for titles for the various courses. There would seem to be at least one freshman subject upon which all of these thirteen schools are agreed, and that is the subject of chemistry. There is, however, a variation of from 160 to 320 hours in the freshman courses in chemistry. I think it would be worth while for us to note the various numbers of hours which the different schools devote to the teaching of chemistry in the freshman year, when, if we would take from those figures an average number of hours, we probably would not be so very far from a good freshman course in chemistry.

Turning to the subject of dental anatomy, we find that thirteen schools are teaching dental anatomy in the freshman year, and three in the second year. It is therefore the opinion of the large majority that dental anatomy should be taught in the freshman year, and the average number of hours presented is a little less than 200.

With prosthetic technic there is much the widest variation, so wide that it is difficult to understand.

In English there are seven schools which are registered as giving 96 hours each of English in the freshman year, and three schools are giving the same number of hours in rhetoric. So out of sixteen schools, ten are agreed in giving 96 hours of instruction in English.

To sum up: If we take an average, or close to an average, of the five subjects which are listed here in the freshman year, we get this: 160 hours of chemistry; 192 hours of dental anatomy; 192 hours of prosthetic technic; 96 hours of English or rhetoric, and 192 hours of biology or zoology. Those five subjects, therefore, occupy 832 hours of the freshman course. The prosthetic technic is not quite averaged.

This ought to give us a little ray of hope as to the possibility of getting closer together upon some of these courses. Looking at it in this way, and with the desire to harmonize our courses as far as possible, each school should be inclined to yield a little in order to get more nearly an average.

In this connection I would like to suggest the advantage of a further study of the curricula of these thirteen schools, along with others which may be obtained, in order that a report may come from the committee as to an average curriculum. Such a report would be of assistance to all of us, whether we have already made out our own schedules or not.

Dr. B. Holly Smith, Baltimore

I think the profession is now in a position where they either have to take back their statement that we need four years for teaching dentistry, or apologize to the students that we inveigled into our schools when we are filling out the time with English, mathematics, rhetoric, etc.

If these men have not been trained in their preliminary schools before coming to us, we have no business to take them. The members of the medical profession certainly cannot without a grimace look into the face of a teacher in a dental school. "But," says this teacher, "we have gone to four years for the purpose of teaching English, physics, rhetoric and public speaking, and in one instance, I think, throat and nose diseases and various other subjects." It is true, anything that is taught certainly increases a man's culture, increases his usefulness, gives him a broader mind and more logical thought and things of that kind. But this is not the playground upon which to drop new games to dental students. This fourth year should be something like a postgraduate year, where our men should be trained at the chair to do the work that will have to be done in after life, supplemented of course by lectures, diagnostic clinics, oral surgery, etc. When turned out of our colleges then they will be capable of going into a dental office and performing the duties of a dentist.

Certainly the difference in the style of title to the subjects that are taught could be harmonized. One school calls a subject one thing and one another, but they are all teaching the same thing. The essayist stated that only one school taught a certain subject which I know is taught in every school, although it happens to be taught in but one school under that particular name.

Dr. T. W. Brophy, Chicago

I would make this suggestion: That schools which have not sent in returns for the use of the committee, do so as early as possible, that the results may be published in all these charts. As it is the charts are certainly very incomplete. I see no reason why the committee should not receive from every school figures showing the amount of work that each school does. If the committee can get these reports it will be able to make out correct charts of the work done in the schools of this Institute. Otherwise they will be very incomplete.

Dr. Joseph Nolin, Montreal

The questions asked the different schools have not all been answered. I know that in our special case we have a different conception of the distribution of subjects through a four year course than many others seem to hold. The questions as put could not very easily be answered by us. We started our four year course, ten years ago, without any traditions to bind us down to a definite programme, as traditions are apt to do.

After studying the curricula of most American dental schools, and that of many European dental and medical colleges, we decided on the following division of subjects, and I am still looking for one which is more rational and effective: The course is divided into two periods, of two years each, called *primary* and *final*.

During the *first period* the student studies the human body, the mouth and the teeth in their *normal state* through anatomy, physiology, histology, and general biology. Auxiliary subjects such as chemistry and bacteriology are also primary subjects. The student is also made to develop his mechanical and artistic skill by *drawing*, *carving* and *prosthetic* and *operative technic*. In the *second period* he studies the body, the mouth and the teeth in their abnormal state, as well as the methods of restoring them to normality, and he is kept busy, in the infirmary, applying his knowledge under the most capable teachers available.

This plan in my estimation gives a better basis upon which to build a four year course than that adopted by the essayist.

He has endeavored to build a four year course on an analysis of what existed under conditions different from those we wish to establish. Would it not be more practical to get a general idea of what we desire independently of that which already exists, and then, through synthetic methods, to plan a course which would be both more logical and effective. It would be building *towards* a complete ideal instead of *from* defective and haphazard conditions.

Dr. J. O. McCall, Buffalo

We are perhaps a little bit in danger of getting our minds focused on figures a little too strongly, rather than focusing our attention quite clearly enough upon the ultimate objects of the dental course, and particularly the ultimate objects for which you contemplate adding a year to the present three year course. My understanding of that matter was that we were to make ourselves better dentists, by which I mean better men from a medical standpoint. The intimate relationship between the mouth and the rest of the body does not need to be more than mentioned, but in planning our curricula right through from the freshman year on, I think we should keep that point in mind. And as it has not been mentioned tonight, I think it should receive consideration with this subject.

Dr. Gethro
(Closing the discussion)

In closing, I merely wish to say that I think most of us fail to appreciate the number of hours a student can put in at school and still be in such physical and mental condition that he can study intelligently at night. Most of our schedules are so full that it is impossible to find any time for daylight study.

Most educators agree that after a student has put in eight hours a day he has passed his point of greatest efficiency. In other words, he is overworked and the time spent in excess of eight hours is detrimental rather than beneficial. One of the principal objects of dental education is to make our students read and study. The one question that I want to leave with you is—are we succeeding?

DELINEATION BY THE MOVING PICTURE AS A FACTOR IN DENTAL EDUCATION.

DR. EDGAR C. KIRK, PHILADELPHIA.

That which I shall endeavor to do tonight is to present to an audience of dental teachers for their critical consideration, an attempt that we have made to utilize the motion picture as a means of lecture illustration. That is our objective.

With reference to this experiment, you are all familiar with the motion picture as a means of entertainment, but it has seemed to a great many minds that the larger field of usefulness for the motion picture is in educational work. The Clinical Film Company of New York has been specializing in the matter of making records of surgical operations for educational purposes, and they became interested in testing out the possibilities of motion pictures for use in the illustration of lectures in dental schools. This subject is one in which I have been personally interested for a considerable length of time, not only from the point of view of the motion picture itself, but from the standpoint of the use of these pictures as a method of lecture illustration which would tend to enforce the teachings and to appeal to the perceptive faculties of the student in such a way as to impress him with the principles taught.

What we shall present tonight is merely what may be called a sketchy demonstration of the work that has been done thus far in special dental lines; that is, the use of the motion picture in recording dental operations. They are presented for critical consideration as a mode of teaching and not for the purpose of presenting particular methods of technic. And the first picture we shall show this evening is a dental operation that perhaps some of you are too young to have remembered, and that is the old and practically obsolete method of filling a cavity in the grinding surface of a molar tooth with non-cohesive gold foil by the cylinder method and hand pressure. Incidentally I may say that I am tempted to call this film "Why not?"—because the technic of the operation is shown, the time required for insertion of the gold foil filling is given, and the film concludes with the picture of a filling of the same sort put in by the same operator and by the same technic fifty-one years ago in the mouth of a patient here tonight, the operator also being present.

I would repeat that this presentation really involves the question of the utilization of this method of instruction as a substitute for the dental clinic. I want you to consider how few in this audience could see this operation if performed at the chair.

No. 1. Reel showing method of filling cavity in grinding surface of molar tooth with a non-cohesive gold foil filling by the cylinder method and hand pressure; operator, Dr. E. T. Darby.

No. II. Reel showing operation for removal of teeth under nitrous oxid anesthesia; operator, J. D. Thomas, D. D. S., Philadelphia.

No. III. Prophylactic treatment of dentures; operator, Paul Stillman, D. D. S., New York City.

No. IV. Illustrating the removal of impacted third molars, demonstrating two methods of operation; one case in which the impacted molar is removed with the elevator, and, on the other side, where it becomes necessary to use the surgical engine to remove the overlying bone; operator, Dr. M. H. Cryer, Philadelphia.

No. V. Root amputation under anesthesia; operator, ———.

No. VI. Reel illustrating the system of Dental Hygiene and Prophylaxis employed in the Bridgeport, Conn., Public Schools, under the supervision of Alfred C. Fones, D. D. S., Bridgeport.

DISCUSSION.

Dr. T. W. Brophy, Chicago

I feel that we should all be very glad that Dr. Kirk has taken up this work. He wrote to me some time ago asking that I come to Philadelphia and give a demonstration for the purpose of having a moving picture made of it. I have always been in doubt as to the possibility of procuring a good picture of an operation within the mouth, at least as far back as the soft palate. A picture was made yesterday, and the operator tells me that he has succeeded in getting a very good result, although that remains to be seen after the picture is developed and put in form for projection upon the screen. In any event, whether that picture is good or not, personally I feel very grateful to Dr. Kirk for starting in on this work. He has this evening shown us enough to convince us all that we can rely upon having this work done in a way to be of great value to us in teaching. The demonstration of Dr. Darby's filling was in itself sufficient to make us glad of the opportunity to be here. The work in prophylaxis among the school children—these things are all of great value. It appears that Dr. Kirk is especially fitted to do this work, and his opportunities to enlarge upon it and bring out a great deal that will be of value to every school in the country and outside of the country in teaching by these methods are abundant. The picture demonstrating the work being done among school children was intensely interesting, and such an exhibition in the presence of miscellaneous audiences will be greatly appreciated.

When in the active practice of dentistry I tried to impress upon my patients the correct methods of brushing the teeth. Very few

people know how to brush the teeth, they have to be taught this. And if the dental teachers here tonight are impressed with the correct way of moving the brush, inside the teeth and out, up and down and every way, in order to thoroughly cleanse the teeth, this will enable them to go home and do other work of value to all of us.

Dr. Arthur D. Black, Chicago

We all appreciate very much these pictures. Just one suggestion came to my mind in connection with Dr. Darby's film: There might be applied to these exhibitions the same plan that is used in moving picture shows generally by showing the close up view; for instance, a messenger boy comes in and hands the lady a letter, then the reel is changed and a higher magnification of that letter is given so that the audience may read it, then the lady is shown again. In the same way the operation could be started in the mouth, then the operator could demonstrate parts outside the mouth, thereby carrying on some of the technic in better light and show it to greater advantage, after which he could go back to the mouth again.

Dr. J. H. Kennerly, St. Louis

Commercialism is usually the first agency to recognize the value of anything that is comparatively new. I never saw a radiograph of dentistry so thoroughly illustrated by means of the film as I did last night. Dr. Wallace Wood and I stepped into a picture show which seemed enticing, and after the main film was finished a picture was introduced to show what remarkable results could be obtained in a dental office from the use of the film. In the first picture shown was the waiting-room of a dental office full of patients, and the operating-room with a patient in the chair. A tooth was extracted, evidently with a great deal of pain because the man came out with both hands up to his jaws and groaning, the people in the waiting-room saw him and quietly slipped out one by one. This operator conceived that there should be some way to show that this work may be done painlessly. So he went out and secured the services of a man who would come in with his face all puffed up, he slips into the operating-room and when he opens his mouth the air explodes and the swelling is all gone, the dentist paints the tooth with iodine; there are many waiting patients, and this man walks out through the waiting-room smiling, apparently his tooth had been extracted, and he says, "It didn't hurt a bit!" Each time this demonstration was made the room was full of patients, the man would come in evidently suffering great pain and always went out smiling.

If it is good for the commercial man it is good for us, and I think we can make use of it in dental teaching as a very effective means of impressing upon the mind of the student those things which should be emphasized.

Dr. A. W. Thornton, Montreal

There can be no criticism of these pictures from the standpoint of teaching. I noticed in one of the pictures, however, something that may have escaped the eye of some of you; that during the work in the school there was exhibited the Stars and Stripes. I was glad to see that, because the childern were learning a lesson other than the one taught in prophylaxis. An American woman who wrote very many beautiful things, and some not quite so beautiful, has written the story of a woman who was dying and leaving her child to be brought up by some one else; and she said:

"Next to her God, teach her to love her country;
In her young bosom light the patriot flame,
Until the soul within her shall expand
With love and fervor at her country's name."

Recently this country has been talking much of preparedness. No preparedness can be better than that the country stands for preparedness. Early in the present war the people of Britain found that 60,000 men of military age, otherwise physically fit, had been rejected because of bad mouth conditions. And, realizing what such wastage meant, they asked that these 60,000 men should present themselves for enlistment; they did so, the dentists put their mouths in shape, and those men are now doing service for Britain because the dentists did that necessary work for them. It should be learned in every civilized country what preparedness stands for.

Dr. Thos. L. Gilmer, Chicago

First we had drawings, then lantern slides, which latter we thought a great improvement over previous methods of illustration, and they were. And now we have the moving pictures. If, as we hope, they are as much better than the lantern slide was better than the drawing, it will be a great boom to the teaching of dentistry.

As the pictures were projected on the screen it struck me that it would be very interesting for future generations if we could leave films showing the methods of operating at the present time. It would interest those coming after us, as you who had never seen

the soft gold foil fillings made, were interested when you saw the films of this old method.

Another thought suggested itself to me: I have noticed in our clinic-room the posture of students as they work at the chair. We try to teach them the proper way to stand, but moving pictures made of students when they were not posing expressly for a film might be helpful to them. Science has taught that a great many movements are made that are useless, absolutely a waste of time. Therefore if our movements could be painted for us on the screen, we might eliminate some that are useless.

I believe that this method of illustration promises a great deal for teaching in dental schools. I am not so certain that in oral surgery we will be able to get much that is practical from it, as, for instance, in palate operations. It may be that I am mistaken on that point. If the mouth can be properly illuminated and if the hands do not obscure vision of the work, it will be helpful. But there are many other uses to which it may be put which I hope may be of benefit.

We are under obligation to Dr. Darby for registering this beautiful piece of work, which will go down to future generations.

Dr. A. E. Webster, Toronto

I have been very much interested in the presentation of this subject. But we must not expect too much of this method of illustration, as we did expect too much of the lantern slide.

There might be some criticism of the speed with which some of these films were run through for student teaching. It is very good for postgraduate work, but doubtful for student work. I believe it would be advantageous to employ this method of illustration the first time over any subject so that the student might get a grasp of the matter as a whole, then take him over the detail by some other method of teaching, after which review the subject with the moving picture film. In that way I believe we could in the end clear up many details which might have been hazy through all the other methods of teaching.

Dr. B. Holly Smith, Baltimore

In regard to the practicability of this as a feature in teaching, I would like to ask something about the cost; if we were to attempt to teach every step in operative dentistry by this means whether it would be practical, whether we

could have films made and sustain a moving picture apparatus in a teaching institution. I would like to ask Dr. Kirk what was his experience in the preparation of these films in regard to that.

Dr. Wm. A. Giffen, Detroit

I appreciate the privilege of taking part in this discussion. I believe it should be the aim of every clinician or dental teacher to demonstrate the most definite procedure known in whatever subject he is teaching. It is unnecessary to know the many different ways in which a certain operation may be performed (which seems to be the ambition of most college instructors) but it is necessary to know the one best method by which the student may obtain the most accurate or the most scientific results. In other words, *dental technic should be standardized as rapidly as possible.* This can be done through the medium of the motion picture and done in much less time than any other way.

I have had more experience in demonstrating dental technic and procedure by means of motion pictures than any other dentist, being the first to produce and show films of this character. Six years ago I produced a set of films to illustrate a paper I was to read, entitled "Making impressions and models for the construction of artificial dentures." They were received very cordially by the profession. Thousands of dentists have seen this demonstration instead of a few hundreds if they had been forced to depend upon clinics.

I believe a practical method can be worked out whereby dental colleges might use motion pictures through a central exchange for demonstrating to students all operative procedure as fast as standardized, at a nominal cost.

Great care must be exercised in making the pictures. The field of operation must be properly lighted. The camera focused right and the operator must be an expert as faulty technic would ruin a picture and throw discredit on the work. Surgical operations should be demonstrated on the cadaver for the reason that blood shows black on the screen and the act of sponging by assistants or operator obstructs the view and adds greatly to the expense of producing a picture.

Summary of Dental Pictures

The motion picture is the best medium for teaching and demonstrating yet devised, but in order to be accepted by the colleges it seems to me that it will be necessary to select a board of censors for

each subject. They to select the most expert operators to operate before the camera under the most favorable circumstances. The censors to allow nothing to pass but perfect work.

Dr. Kirk,
(Closing the discussion)

I know nothing of the commercial side of this question. The President of the Clinico-Film Company can give you all information as to cost, etc. I am not interested in that phase of it; I am helping him to spend his money for the research work in which I am personally interested. I do not care what it costs as long as he pays the bill. What I am trying to do is to determine for myself, and for my colleagues, whether this device of the moving picture can be adapted to educational ends in the dental profession. That is my problem.

Now, I have confined this exhibition to dental subjects. I fully appreciate the point raised by Dr. Black that the building of these films for distinctively educational purposes is complicated. It needs to be developed exactly along the line Dr. Black has indicated, and in the realm of surgery that has already been done. I should have been very glad indeed to have shown a surgical film, which I think has the teaching quality more than any of the films shown tonight. These have not been developed adventitiously in the sense of completing the textual accompaniments, diagrams, and so on, which should go with a teaching film in order to be useful in work with the undergraduate body. Thus far they are merely records of the progress of the work towards a film library. There are numbers of others that have been taken, but these were selected as illustrative of the whole question.

I want you to keep clearly in your minds a line of sharp demarcation between the amusement, or commercial, side of this thing, and its use in systematic education. It is only from the latter point of view that I am interested, and only from that point of view that I have presented this work tonight.

Dr. Smith has introduced the commercial side this evening. I hope it will not cost much. As yet the subject is wholly in the experimental stage, and I have presented it to my suffering brethren in the cause of education to see how it strikes you as a way of delineating, as an adjunct to add to the impressiveness of what we are doing—impressiveness in the sense that it appeals to the perceptive sense of the eye directly.

Perhaps I may illustrate more particularly what I mean by this little incident which I read in the paper: A teacher said to a

little boy in his school, "Suppose a boy from some out of the way country should come to you and ask, 'What is a horse?'—how would you define a horse to that boy?" "Well," the boy said, "I would tell him that the horse was an animal with four legs, a tail, head, ears"—and then he stopped. The teacher asked the next boy, "What would you say?" "I should say," said the next boy, "that the horse was a mammal with hoofs." The third little boy gave a definition that was equally incomplete, and finally the teacher asked another little boy, "How would you define a horse to such a boy?" "I wouldn't define a horse at all, I would take him out and show him one," was the reply. That boy had a pedagogic instinct, with all apologies to Dr. Friesell. And that is the principle behind this motion picture problem. It is an appeal, not to his ear alone, but to the eye as well. What do we do when we appeal to the ears alone? In describing something to the student we demand that he shall dig out of some past experience a mental image that is like this thing that we are talking about. It requires an intellectual effort for him to picture in his mind the things about which we are talking. But if we hold it up before him, the thing itself, it takes little talk to explain it, he has the real thing before him which he can appreciate almost without verbal explanation. The motion picture is a means of education that has unlimited possibilities, as I see it. I am so enthusiastic about it that I wanted the corrective effect of you saner men, who have not been carried away by the interest this has aroused in me. And I am hoping that we may then be able to decide reasonably and rationally whether it is worth while to go on and develop this enterprise with your help.

The educational use of the motion picture is not only in the field of dentistry, but in the field of general education, and the time is close at hand when some one will capitalize this whole movement and establish a system of film libraries dealing with nearly all departments of human activity, and these libraries will be accessible to teachers. The United States Government is already doing this in certain fields of education. And such a library, when it is built up, ought to be at the service of dental educators. I think that is the ideal thing. It may be financed by a process of subscription or outright purchase, something of the kind—what it will be I do not know, I have not investigated it. I want first to see the thing produced, then we can decide how to disseminate it.

Some weeks ago an exhibition was made at the University of Pennsylvania to an audience of teachers, more particularly surgeons, medical men, and teachers representing various departments of

activity of the University. And the problem was put before them as it has been put before you tonight, to judge of this matter from the educational point of view. The pictures were mainly surgical in character, and Dr. Edward Martin, one of the professors of surgery who was asked to come and view the exhibition from the standpoint of the teaching of surgery, said: "I want you to consider this: You, this audience of 600 people, have seen this exhibit and you have all had, so far as this particular operation is concerned, a view of it which I can assure you is, in the clinical room, only obtained by the operating surgeon and his first assistant. More than that, I would say that you have seen more than either of them have seen, because you have seen the mistakes, the slips in technic, that the operating surgeon subconsciously makes. It would be of the utmost benefit to every operating surgeon if he could have his work filmed, and then he could study his work from the pictorial record and have it act as a corrective to his own mistakes." He would have found false motions, abortive attempts to do this or that, which should not have occurred in the hands of a skilled expert, and yet they do occasionally.

What you have seen tonight is not as complete as the records made on the surgical side, because the latter have been more carefully developed and studied. The next day after the exhibition referred to I was called on the long distance telephone by a gentleman in Harrisburg, who said: "It was simply astounding. Motion picture records such as I saw last night are destined to absolutely supplant clinical demonstration in surgery."

As has been referred to here, the motion picture is a means of recording operations done by the masters in our profession. We have heard a great deal about the Brophy palate operation. But Dr. Brophy will not always be with us, and some younger and more inexperienced surgeon of the future will be doing what he calls the "Brophy operation," but it will be different in many essential details, and it will be insensibly modified in this way until, if Dr. Brophy should come back here a thousand years hence when the "Brophy operation" is done by some of his super-man successors, he would not recognize his own operation. But he would have the film record with which to refute the plagiarism. What a splendid thing it would be if we could record not only those things, but the voices of some of our friends. Here we have the fingers and hands of these men who are masters in special branches. So forgive me for being enthusiastic about motion pictures in dentistry.

Dr. H. T. Smith, Cincinnati: Have surgical films been used in teaching classes, and, if so, what impression has been made upon those classes?

Dr. Kirk: I do not know what impression motion pictures have made upon students of surgery, but I know that when it has been announced to a class of dental students that motion pictures are to be shown they are all present.

REPORT OF THE TEXT-BOOK COMMISSION.

Mr. President and Members of the Institute:

The Commission desires to thank all those who have so kindly cooperated with it during the past year and at this session. Through some misunderstanding the plan, which was adopted as the result of the discussion of our last report in Minneapolis, was not fully comprehended and its provisions were not carried out in season to make as comprehensive a report upon new publications as we desired. This plan included the formation of sections of the Institute, the chairman of each section to review the new books and editions which were issued during the year and such report to be included in the report your commission is now placing before you. That this plan is a most excellent one we are certain and in the coming year—now that it has had its initial trial—we feel sure that it will be most successful. The following reports have been appended:

Section I, Dr. Morgan, no report.
" II, Dr. Thornton, no report.
" III, Dr. Lucas.
" IV, Dr. Bruening.
" V, Dr. Long.
" VI, Dr. Webster.

We have, during the year, received much assistance from the publishers and at this session representatives from several have been present for conference. The spirit of cooperation between the publishers and the Institute has developed greatly since the formation of the commission and we expect great results in consequence.

About ninety books have been on exhibition, of which almost one-third are either new issues or editions later than 1915. The following is the list:

*BOOKS ON EXHIBITION AT THE INSTITUTE.

P. BLAKISTON'S SON & CO.

Broomell & Fischelis, Anat. and Hist. of Mouth and Teeth.
Morris, Anatomy.
Brophy, Oral Surgery (new).
Buxton, Anaesthesia.
MacNeal, Micro-Organisms.
Stitt, Bacteriology, 4th ed.
Sayre, Materia Medica and Phar., 4th ed.
Autenreith, Det. of Poisons and Powerful Drugs.
Buckley, Dental M. M., 3rd ed.
Dalton, Orthodontia.
Johnson, Oper. Dent.
McGehee, Oper. Dent. Anat. Tech.
Ryan, First Aid Dent.
Tomes, Anatomy.
Citron, Immunity.
Gould, Prac. Dictionary.
Gould, Pocket Dictionary.
Lewis & Stohr, Histology.
Hopewell-Smith, Histology.
Hopewell-Smith, Microscopy.
Kober & Hanson, Diseases of Occulusion (new).
Gould & Pyle—Cyclo.
Gould & Pyle—Pocket.
Brubaker, Physiology, 5th ed.
Halliburton, Phys.

LEA & FEBIGER.

Smallwood, Text-book of Biology, 2nd ed.
Cryer, Anatomy, 2nd ed.
Pesso, Crown and Bridge Work (new).
Wilson, Dental Prosthesis.
Fischer, Local Anaesthesia.
Burchard, Pathology.
Noyes, Histology.
Hopewell-Smith, Anatomy.
Sturridge, Electro Therapeutics.
Brown, Oral Diseases.
Turner, Prosthetic Dentistry.
Kirk, Oper. Dent. Surgery.
Lischer, Orthodontics.
Mikell, Dent. Jurisprudence.
Long, Materia Medica.
Simon and Base, Man. of Chemistry, 11th ed.
Shafer, Ess. of Histology, 10th edition.

C. V. MOSBY CO.

Davis, Oper. Dentistry, 2nd ed.
McCoy, Radiography (new).
Pearce - Macleod, Physiology, 2nd ed.
Dewey, Dent. Anatomy (new).
Dewey, Orthodontia, 2nd ed.
Dewey, Comp. Dent. Anatomy.
Blair, Surgery.
Severens, Cavity Preparation.
Brothers, Jurisprudence.
Hughes, Questions and Answers.
Hodgen, Metallurgy.
Prinz, Materia Medica, 4th ed.
Woolley, Pathology (new).
Buchanan, Anatomy.

W. B. SAUNDERS CO.

Jordan, Bacteriology, 5th ed.
Holland, Chemistry, 4th ed.
Allen, Local Anesthesia.
Goepp, Dental State Board, 2nd ed.
Grant, Face, Mouth, Jaws.
Hill, Histology.
Ivy, Anatomy, Surgery, 3rd ed.
McConnell, Path and Bact.
Preiswerk—Warren, Atlas.
Scudder, Tumors.
Amer. Ill. Dictionary.
Amer. Pocket Dictionary.
Slade, Physical Examination, 2nd ed.
McConnell, Pathology.
Stevens, Materia Medica.
Bastedo, Materia Medica.

WILLIAM WOOD CO.

Kirks, Physiology.
Cunningham, Anatomy, 6th ed.
Stedman, Dictionary.
Bailey, Histology, 5th ed.
Hepburn, Metallurgy.
Delafield, Pruden, Pathology.
Underwood, Underwood, Aids, Anat. and Histology.
Calon, Phys. Diagnosis.
Hirschel, Anaesthesia.
Buchanan, Manual of Anatomy, 3rd ed.

J. B. LIPPINCOTT CO.

Wood, Pharmacology and Therapeutics, 2nd ed.
Johnson, Success in Dental Practice.
Marshall, Mouth Hygiene, 2nd edition.
Marshall, Operative Dentistry.

SURGERY PUBLISHING CO.

The American Year Book of Anaesthesia and Analgesia.

RITTER & CO.

Thoma, Anaesthesia.

*Where "new" or "ed." is not mentioned, the publication date is prior to 1916.

Commission:

A. E. WEBSTER,
ELLISON HILLYER, Chairman.

APPENDED REPORTS BY CHAIRMEN OF SECTIONS.

As a member of your committee, I beg to submit the following report upon the subject of text-books for the teaching of oral surgery:

In the writer's opinion, the text-books upon this subject are arranged more for the purpose of making oral surgeons of our dental students than for giving them a comprehensive idea of the principles of surgery.

No doubt the most comprehensive work upon this subject has been given to the profession by Dr. Truman W. Brophy, however the work in minor oral surgery and detailed technic for this branch of oral surgery is rather incomplete.

Dr. Blair's work, second edition, is more applicable and more conveniently arranged for the dental student.

We believe that the student in dentistry should have a comprehensive understanding of surgical technic of minor oral surgical procedure.

It is hoped that in the near future some member of our profession may deal with this subject in a manner which will be of more vital interest to the general practitioner of dentistry.

Dr. Brown's work upon this subject would be criticised in the same manner.

We were disappointed in not receiving a copy of Dr. Ivy's book on oral surgery in time to report upon same.

CARL D. LUCAS.
Sec. 3, Oral Surgery and Radiography.

No purely dental histology has appeared during the year 1916.

The Appleton Company has published the work of Harvey E. Jordan, A. M., Ph. D., Professor of Histology and Embryology, University of Virginia, and Jeremiah S. Ferguson, M. Sc. of Maryland, formerly Assistant Professor of Histology, Cornell University Medical School.

This book is a volume of 750 pages, with 594 illustrations, covering the subject in condensed form from a general viewpoint. The section on the mouth and teeth occupies 16 pages with 14 illustrations. This part is not up to date and is lacking in details. The cuts are not as good as they should be in a new book.

E. H. BRUENING.
Sec. 4, Dental Histology.

In the branch of Materia Medica and Therapeutics no new books have come to the attention of your Commission during the

past year. The books now in use may be said to possess a standard character, the choice of any one depending upon its detail and adaptability to the method of teaching employed. In view of the recent issue of the new U. S. Pharmacopoeia it is probable that all of these will be revised in the near future, so as to conform to the new official standards. The enlargement of curriculum that the four year course will permit will give opportunity for a broader treatment of this subject, and your commission would suggest that revisers of the text-books bear this in mind.

E. H. LONG,

Section 5, Materia Medica and Therapeutics.

There is some difficulty in connection with the presentation of this report, because I have as yet seen no definition of dental pathology. I do not know what dental pathology is, and I do not believe any of us do. This morning we heard about pathology, dental pathology, therapeutics, operative dentistry, prosthetic dentistry, and oral surgery, all mixed up together. I do not know what real dental pathology is. Until we have some clear, concise distinction between the practice of dentistry and dental pathology, or pure pathology, we cannot enter into a discussion of the text-books because we have no true independent dental pathology which treats only of pathological diseases applied to dentistry. As one of the gentlemen said this morning, pathology is pathology. What is applied to dentistry is all right when properly applied, but we have no book on pure dental pathology. We have books combining operative dentistry and therapeutics, the best example of which is, I think, Dr. Black's very excellent book.

A book just published on "Abscesses," by Thoma, is along a new line, and while it cannot be said to be a text-book, it contains very excellent material. There is a book edited by Tomes which contains sections of very excellent dental pathology. However, this is not intended for a dental pathology at all, but for another purpose. Then, of course, we have the Standard Dental Pathologies, but it is not pathology as pathology is understood in the general department of medicine.

A. E. WEBSTER,

Section 6, Pathology and Bacteriology.

IN MEMORIAM.

CHARLES RUDOLPH EDWARD KOCH, D. D. S.

Since our last meeting, there has been removed from our midst by the hand of Death, Dr. Charles R. E. Koch; therefore

BE IT RESOLVED, That this AMERICAN INSTITUTE OF DENTAL TEACHERS place on record at this meeting, held in Philadelphia, Pa., January 23-25, 1917, the deep sense of loss which we all feel in the death of our beloved fellow-laborer.

Dr. Koch died in his seventy-first year, and had been a member of the Dental profession since about the year 1858. For thirteen years he was the valued secretary of the Northwestern University Dental School, and accomplished a great work for that institution. But his activities were not confined to the school with which he was so intimately associated. Because of his great executive ability, and his influence in moulding dental legislation, he has laid the whole dental profession under tribute; and his untiring energy, and magnificent unselfishness will long remain an inspiration to those of us who were permitted to work with him.

He was a soldier throughout the Civil War; Secretary of the Illinois Vicksburg Commission, which did a wonderful work in erecting Memorial Temple and regimental markers, and in publishing a large, historical volume of the siege of Vicksburg under the title, "Illinois at Vicksburg."

He rests from labor—we mourn his loss, but bow in submission to the inevitable.

"Leaves have their time to fall,
And flowers to wither at the North wind's breath,
And stars to set, but all—
Thou hast all seasons for Thine own, O Death."

J. D. PATTERSON.
A. W. THORNTON.
HENRY W. MORGAN.

REPORTS AND PAPERS OF THE SECTIONS.

*OPERATIVE DENTISTRY.

DR. DANIEL H. SQUIRE, BUFFALO.

(Read before Section I, Henry W. Morgan, Chairman.)

In presenting a plan for the teaching of operative dentistry, one is impressed with the ever increasing demands of science upon dental practice in its relation to bodily health. The scope of this subject has developed and broadened until the influence of dental infection is known to extend through all of the vital processes of the human organism, so that its practice today means in the larger and truer sense, protection to life itself and dentistry has become the keystone in the arch of preventive medicine.

Heretofore, operative dentistry has been considered in the main, a reparative work, but in view of the knowledge which has come to us through scientific endeavor, this subject should stand primarily for the prevention of disease and secondarily, for mechanical repair. It is for this reason that the writer would offer two important items relative to a revision of this course of instruction.

First: That the subject of operative dentistry has been presented to the student from the wrong viewpoint.

Second: That the interdependence of the basic and special subjects should be emphasized through a closer association.

As to the first, the concept of a dental student, whether it be great or small, is first awakened, then stimulated and finally grows and develops along the line of its very first glimpses of dentistry. If we inculcate in that concept the thought of preservation of tooth structure instead of its repair, his ambition and endeavor would be directed throughout his professional career, in using every means at hand toward the prevention of dental disease. Such service would be the greatest that could be rendered to mankind and it is time that the pendulum of instruction in dental colleges swung toward prophlactic rather than reparative measures.

The ambition of the present day dental student is to place a highly polished gold filling in some convenient spot upon the surface of a tooth. He does not care for the detail of pulp canal treatment, neither is he enthusiastic about the use of the other filling materials

*See chart, page 213.

and as for the removal of deposits about the teeth and their prophylactic treatment, he feels that such work should be done by machinery.

In the light of our present knowledge, it is no longer safe to say that a filled tooth is just as good as one which has been kept intact. The resultant changes in the pulp tissue, due to filling and crowning processes, are such that in many instances, either cause its death, or lead to its ultimate degeneration. Again, we are forced to admit that perfectly filled pulp canals are not above suspicion, as a contributing factor of bodily infection. The medical man is ordering such teeth removed daily and the bacterial cultures taken from the root ends and from the infected areas show the same organism.

The writer cites these cases which we all have to combat in our daily practices, in order to show the necessity for a conserted action upon the part of dental teachers, toward bringing about some plan, which will reduce the amount of repair work in the future by changing the viewpoint of the student.

There will be none the less interest shown in the reparative work. On the other hand, it will be done with even a higher degree of efficiency, as the simple cavity preparation and the filling process will not be the goal toward which the student is striving, but an integral part of the whole plan of better dental service.

The writer is not unmindful of the wonderful progress which has been made in operative technic toward the prevention of recurrent decay, but the time has past when it should be made the most prominent part of our educational system.

Coming to the second point—that the independence of the basic and special subject should be emphasized by a closer association in teaching.

A theory of teaching which deserves the name is the one which is in the closest possible touch with actual laboratory work. Teachers should always let the student see that fundamental knowledge will be of great worth to him, in that it will aid him in understanding and doing those things which will be of practical value to him. The instruction in the basic subjects must set forth the materials of knowledge in such a way that their true inherent relations may be grouped and that their interdependence may be explicit.

This applies to anatomy, histology, oral surgery, dental anatomy and orthodontia, which are considered in this outline to be

of greater importance to operative dentistry in the development of its theory than the subjects of pathology, bacteriology, dental medicine, practice of surgery and radiography, which are so closely interwoven in its practice.

The student cannot be interested in these subjects unless their bearing upon dentistry is constantly set forth in the teaching, as one cannot now teach a subject by main strength.

Anatomy: The dental interest may be emphasized in the description of the bones, muscles, blood vessels and nerves, by referring to the mouth cavity, the movements of the jaw, facial expression, the dental origin of neuralgia and of facial paralysis and in many other instances when the tissues in question are sometimes involved in dental disease. These references are only a few of the many cases which may be cited and will give to him an entirely different attitude toward the work in the anatomic laboratory and in his interest of anatomy in general.

Histology: In the study of the dental tissues the dental connection may be shown toward the methods of actual practice, as the influence of fillings upon the tissues of the dental pulp, in its protection and its degeneration. In the study of enamel, dentin and cementum, the principles of cavity preparation may be explained relative to seating the filling, its anchorage, the inclination of cavity walls and the treatment of the cavo-surface angle.

Oral Surgery: In teaching the principles of surgical procedure, interest may be stimulated by referring to the repair of fractures of the maxillae, in extraction of teeth, pyorrhea alveolaris, cleft palate, hare lip, amputation of roots, resection of bone as applied to the jaws, and in reference to tumors of dental interest.

Orthodontia: The principles of normal occlusion which are so little comprehended by the average student could be made more practical by connecting mal-occlusion with some methods of dental practice—as in premature and delayed extraction of deciduous teeth. Lack of contact in mesio-distal planes of deciduous and permanent teeth and delayed orthodontic treatment after the eruption of the sixth year molar.

Dental Anatomy: This is a most interesting subject when the association of tooth forms and character of surfaces are reproduced as a whole in the hand-carved porcelain crown or in part by the process of filling. It is well known that this subject is the foundation of all operative work, but in only a few dental schools is it given major prominence.

From the foregoing statements, it will be seen that the teachers of the basic subjects will be expected to have a certain amount of general dental knowledge.

In considering the value of the basic subjects, anatomy and orthodontia are related to the preventive side of dentistry and may well lead to a course in oral hygiene, while dental anatomy, histology and oral surgery are concerned in the reparative processes and are the fundamental subjects of technical procedure.

In order to give to the student the right viewpoint, oral hygiene should be the subject of the opening lecture of the dental course. It should deal with the principles and methods of preventing oral disease and later on, the subject may be the introductory course of operative dentistry, taking up the question of mouth hygiene from two viewpoints:

A—The cavity of the mouth, per se, studying the anatomy, function, and the infection to which its parts are liable.

B—The cavity of the mouth in its relation to bodily health. Under this heading the normal mastication and insalivation of food is discussed—then the abnormal, as incomplete mastication, the polution of food by pus and debris from carious teeth. Next, the direct invasion of the blood stream by bacteria from the gingival, peridental, periapical tissues and the tonsil; again, indirectly from bacteria being swallowed and entering the blood stream through diseased areas of the alimentary canal. Lastly, taking up the treatment of the hygiene of the oral cavity, in recommending general bodily cleanliness, orthodontic treatment, home care of the mouth, methods employed in treatment of pyorrhea alveolaris and general prophylactic treatment of the oral cavity.

Following this course are the lectures on operative dentistry:

A—The subject is presented with a brief review of the structure and function of the dental pulp, of methods employed for its protection, its destruction and in the treatment and the filling of pulp canals.

B—Instruments. The study of the cutting instruments, nomenclature, uses, sterilization and care. The dental engine, electric appliances and the pluggers used in the manipulation of filling materials.

C—Miscellaneous. The personal appearance of the student, examination of patients, the keeping of case records, the dental chair, its adjustment and positions to be assumed by the student,

care of the bracket and the student's case. The adjustment of the rubber dam, cotton rolls, etc.

D—Hypersensitive dentin.

Classification of patients according to Johnson. Use of medicaments for the alleviation of pain.

E—Management of children.

F—Review of caries, relative to its inception and progress.

G—Principles of cavity preparation of deciduous and permanent teeth.

For porcelain, malleted and cast gold work.

The steps employed in the excavation of caries as resistance, retention and convenience form, etc. A detailed description of the excavation of the five classes of cavities, according to Black, preparation of cavities in regard to special plans of anchorage and the value of the anatomic restoration of tooth forms and its effect upon the surrounding tissue.

H—The history, manipulation, physical properties and uses of gold, amalgam, porcelain, zinc and copper cements, silicate cements and gutta-percha.

I—The filling of cavities with gold by classes.

J—The filling of Class I and II with amalgam.

The adjustment of matrices, malleting and carving.

K—The filling of Class I, II and V cavities with cast gold, direct and indirect methods.

L—The filling of Class III and IV cavities with porcelain, direct and indirect methods. The matrix, shading, building and baking.

M—The filling of cavities with cements and gutta-percha.

N—The finishing of fillings.

The use of stones, knives, saws, strips and disks.

O—Interproximal ware, abrasion and erosion.

P—Bleaching of teeth.

Q—Dental economics.

A technic course should supplement oral hygiene, dental anatomy and operative dentistry lectures.

1—Oral Hygiene Technic.

A—The systematic prophylaxis of the mouth of every student during the college course.

B—Testing the normal secretions of the oral cavity.

C—Examination of stains and of hard and soft deposits.

D—The study of incipient decay, of erosion and abrasion.

E—Observing the effect of the loss of tooth structure on the investing tissues.

F—Making a plaster cast of a patient's mouth and reproducing the stains, deposits, color of the gums, mucous membrane and the beginnings of decay to be found therein.

2—Dental Anatomy Technic.

A—The study of a longitudinal section of a tooth showing the pulp in its relation to the hard dental tissues.

B—Moulding the typical teeth in plasticene (5 dia.).

C—Drawing tooth forms and sections, observing the recessional lines of the pulp.

D—Carving upper and lower jaw in wax.

E—Carving teeth in ivory (natural size).

F—Gaining access to pulp chambers and canals (natural teeth).

G—Reaming, enlarging and measuring pulp canals (natural teeth).

3—Operative Technic.

A—Operative technic begins with a review of the dental pulp, its relations, structure and function, the operation of capping, devitalization and the filling of pulp canals, the application of medicaments, and the cementation of dowels and screws. The method of root amputation, instruments employed, shaping of the stump, etc. Finally, logtitudinal and transverse sections are ground of the upper center incisor, first bicuspid, first and second molar and lower central incisor, cuspid and the first and second lower molars. Making silhouettes of the above ground sections to study the relations of the pulp canals to the pulp chamber.

B—Instrument making.

There is quite a difference in the number of instruments which are required in this technic by the different colleges. However, it would seem sufficient, if the typical forms were made viz.: a chisel, hatchet, hoe, spoon, enamel hatchet, gingival marginal trimmer and the bayonet, corkscrew and parallelogram types of hand pluggers. The sharpening of instruments, methods of sterilization are here emphasized.

C—Principles of cavity preparation are demonstrated upon cubes of wax, because resistance, retention and convenience forms,

the inclination of cavity walls, beveling, cutting steps and grooves, may be better understood by the student, without confusing him with the shape of the tooth.

D—Cavity nomenclature.

Demonstrated upon cavities cut in plaster teeth (enlarged 5 diameters).

E—The preparation of the five classes of cavities according to Black upon the typodont.

F—Repeat Class I and II preparation upon natural teeth, for malleted and cast gold fillings.

G—Principles of hand pressure and mallet force.

H—Manipulation of filling materials, as mentioned in the lecture outlined.

Infirmary Clinic.

The infirmary clinic should be (I say this advisedly) the great melting pot of the application of theory and technic. Here the teaching must be clinical, bringing into actual practice the following branches:

A—Oral hygiene.

Application of methods for the prevention of decay and gingival irritation.

B—Pathology.

The treatment of diseases of the dental pulp, of the peridental and mucous membrane and of the alveolar process in their relationship to bodily health.

C—Bacteriology.

The taking of cultures and growing the organisms to determine the kind of bacterial infection from foci about the mouth.

D—Surgical clinic.

Pre-operative and post-operative treatment in extracting cases, root amputations, fractures of the jaw, pyorrhea alveolaris, etc.

E—Orthodontia.

The correction of mal-occlusion, and the methods of maintaining normal-occlusion.

F—Dental medicine.

The application of antiseptics, detergents, counter-irritants and method of hypodermic injection, etc.

G—Radiography.

Its use in determining the results of the filling of pulp canals, the extent of fractures and foci of infection about the jaws, etc.

II—Physical diagnosis and anesthesia.

The examination of a patient for the more pronounced affections of the heart and lungs, which would make the administration of nitrous oxid and oxygen anesthesia hazardous.

The giving Nitrous oxid and oxygen to patients for momentary and profound anesthesia.

THE SCHEDULE.

FIRST YEAR.

First Semester:

Anatomy, descriptive.
Dental anatomy—Dental anatomy technic.
Histology.

Second Semester:

Anatomy, descriptive.
Dental anatomy—Dental anatomy technic.
Histology.
Orthodontia.

SECOND YEAR.

First Semester:

Oral hygiene—Oral hygiene technic.
Operative dentistry—Operative technic.
Oral surgery.
Dental histology.

Second Semester:

Operative dentistry—Operative technic.
Oral surgery.
Dental histology.

THIRD YEAR.

First Semester:

Operative dentistry.
Infirmary practice.

Second Semester:

Operative dentistry.
Infirmary practice.

FOURTH YEAR.

First Semester:

Operative dentistry—Clinical lectures.

Infirmary practice.

Second Semester:

Operative dentistry—Review of theory.

Infirmary practice.

DISCUSSION.

Dr. E. A. Johnson, Boston

In discussing Dr. Squire's paper the writer would first like to commend him for the clear and concise manner in which he has presented the subject, as well as for the ideas he has given for our consideration. We will be sanguine in hoping that every teacher of dental science will read it not only once but several times, and will then begin at once to put his suggestions into practical operation. Never before has the profession been called upon to make such a radical change in so short a time. Our viewpoints have so entirely and quickly changed that it has left us a bit bewildered in some instances, almost wondering what the next development is to be. Fortunately, opportunities for trained research workers are constantly being provided and operative dentistry will soon be taught from a thoroughly standardized scientific standpoint, rather than from haphazard conclusions arrived at after long continued efforts at the operating chair, which no doubt have been influenced (unknowingly) from a monetary standpoint. With such knowledge it can be intuitively impressed upon the student that the conservation of teeth, forced to erupt in their proper positions, with normal occlusion, surrounded by a hygienic oral cavity, and normal respiratory tract, is of the first and greatest importance, and that the repair of tooth structure is in a great degree a necessity arising from unclean conditions and faulty manipulation.

We as a dental profession have been altogether unmindful of the underlying basic principles which should have formed the ground work for dental education. Instead of an education that would enable the practitioner to teach the public how to prevent an ever growing evil that has been gnawing at the very vitals of humanity for centuries, we have limited our activities to making

it possible for a few men to try to repair the havoc wrought by a constantly increasing insidious degeneration and decay that is gradually undermining the vitality of men, women and children, decreasing their longevity, and tending toward the production of a nation of undersized neurasthenics.

How well we have succeeded is now being shown by the wholesale extraction of teeth and artificial appliances which we had put in the mouth with such confidence and pride, congratulating ourselves upon our wonderful reconstructions. Now that we have found ourselves, so to speak, and have taken the initial step for a four year course of study, let us see to it that we teach the student not only to attack the remains of caries after it has been produced by years of abnormal breathing, chewing, salivation, mal-occlusions and incubating mouth lesions, but also give the student fundamental science and training that will enable him to teach the public as well as the individual the principles and importance of oral hygiene and all that pertains to it.

In order to accomplish this, the entrance requirements for dental schools must be of sufficient high grade to enable the prospective student to enter upon the study of the sciences embodied in the dental curriculum without being a handicap to himself and the rest of the student body as well as the instructors. If the accredited high schools, whose certification is a sufficient credential for admission to a professional school, are not capable of accomplishing this, then the entrance requirements will have to be revised to one year of academic work or its equivalent.

It is without doubt a fact that a majority of training schools are not meeting the requirements of the professional schools, but with a proper re-arrangement of their curriculums it would be possible to overcome the difficulty without imposing the hardships of an extra year upon the prospective student.

It seems to be a logical sequence that the Dental Educational Council, or some other equally interested body, should start a movement, having for its object the standardization of training schools to meet the requirements of the professional schools. The accomplishment of this would in itself be almost equivalent to the fourth year we are about to add to the Dental Course.

Now, having the properly trained student and the four years to work with him, we should give the public a product approaching in efficiency one hundred per cent in value.

The course in Operative Dentistry should begin in the first year and continue for the four years, the first year covering Operative Technic, the other three Operative Dentistry, in all its varied branches. Beginning the second year with Oral Hygiene and Oral Prophylaxis a great deal more time, energy and skill should be devoted to them than we have ever applied to these in the past. To my mind this is the new corner stone upon which modern dentistry is going to build its monument.

The third and fourth years should be devoted to operative work in the infirmary, together with two lectures a week. Manipulation, skill and dexterity can be taught in the clinic but for the purpose of laying an intelligent foundation for the development of a great big, broad-minded, intelligent operator, the lecture room is the only place.

Orthodontia should cover a period of two years of practical work, for it is a physical impossibility to graduate a student with a real working knowledge of the subject in one year, unless he devotes his entire time to it, which, of course, is not possible.

The basic subjects should be covered during the first two years, at the expiration of which time arrangements should be made with all the State Boards to allow the students to present themselves for examination in these subjects. It would relieve the student during the last three or four months of his senior year of a great mental and physical strain, under which many a good, conscientious man has gone to pieces. It would also increase his efficiency in his final clinical work and allow him to start his professional career with a much greater chance of success for himself and honor to his Alma Mater.

H. B. Tileston, Louisville

Dr. Squire has presented a thoughtful paper on the teaching of Operative Dentistry, but I think some of his ideas and conclusions are subject to criticism.

The adjustment of a complete course in Operative Dentistry to fit into a four years' period of study will require very careful consideration and doubtless some readjustments will have to be made from time to time as experience reveals the need and points the way.

From the perusal of college announcements and of text-books written by teachers of Operative Dentistry, as well as from other sources such as the paper we have just listened to, it is quite evident

that no two men agree exactly as to what should be included in a course in Operative Dentistry.

Until we have arrived at a standard where we may meet upon common ground, but little progress can be made in the arrangement of a course to suit the time allotted to it, and we will derive but slight profit from discussions of methods of teaching it.

Would it not be well for this body to take some steps looking toward standardization in all subjects of the curriculum, so that we may have at least an approximate standard to the end that our numerous parts (ideas and methods) will assemble into a machine that will work.

Dr. Friesell presented a paper several years ago on Standardization of the College Curricula, but nothing seems to have come of it. Perhaps it is as hard to harmonize on a standard as it is to agree in the present state of affairs.

I do not agree with Dr. Squire that Orthodontia and Oral Surgery, which he includes in his schedule, and Radiography, Physical Diagnosis and administration of anesthetics which are included in his outline, should be considered as integral parts of a course in Operative Dentistry. These subjects as well as many others, such as Chemistry, Physics, Bacteriology, etc. may well be touched upon in the course of lectures for the purpose of arriving at the second item of importance mentioned by the essayist: namely, "That the interdependence of the basic and special subjects should be emphasized through a closer association," and also for the purpose of implanting in the mind of the student a proper concept and keeping it ever before him, a most excellent point made by Dr. Squire, but each of these subjects is a division unto itself and calls for the services of a specialist as teacher. NO SUBJECT SHOULD BE CONSIDERED A PART OF A COURSE IN ANY BRANCH THAT IS NOT TO BE EXAMINED UPON AND GRADED BY THE HEAD OF THE DEPARTMENT OR HIS ASSISTANTS. Let the man who does the teaching do the examining and grading.

One of the greatest difficulties in managing the curriculum of a college is to keep the different professors from overlapping upon one another's subjects, with the result that the mind of the student is much confused by divergent opinions. In examinations it often happens that something shows up that the teacher in authority never heard of and which may be radically wrong. Moreover it is

unnecessary and wasteful repetition for several teachers to be attempting to teach the same subjects.

There is a disposition on the part of all teachers, especially in Dentistry I think, to look upon their particular branch as the hub and circumference of the whole business and that the other subjects of the curriculum are merely the spokes of their great wheel. A teacher is essentially a specialist and should keep reasonably within his demarcation.

This is not meant as a criticism of Dr. Squire. We all have this tendency more or less.

In considering methods of teaching Operative Dentistry, the question arises as to the real value of the lecture. There can be no question but that demonstration, the actual showing how, is the best means of instructing the student in so practical a subject as Operative Dentistry, at least that part of it which is practical, the operative part, but there are certain principles underlying it which can best be imparted by lectures; and then there are many things that must be told to the students for their general information and the only opportunity of speaking to them all together is when they are assembled in the class room for the purpose of listening to lectures at stated hours.

The ideal plan would be for the head of the department to have general, personal supervision over the entire course from the teaching of technics in the Freshman and Sophomore years through the clinical instruction in the operatory of the Juniors and Seniors; that he should deliver a course of lectures and give demonstrations of all operative procedures to the classes divided into convenient sized sections; that he be present in the clinic every day and that he conduct examinations and grade the papers. In other words, he should devote all of his time, and a little more, to teaching. With a trained corps of assistants in the several laboratories and good demonstrators in the operatory, this program would not be excessive.

Unfortunately teaching is an avocation and not a vocation in the case of a large majority of dental college professors. Most of them are in practice and devote but a small part of their time to teaching. The real instructing of the students is left entirely to assistants and demonstrators according to a system, and often without the personal contact of the head of the department except at brief and widely separated intervals.

Under such circumstances, rendered imperative by the economic necessities of most colleges as conducted at present, the highest order of results cannot be expected.

I do not approve of the essayist's schedule in his postponement to the Junior year of the student's first experience in infirmary practice. We must not forget that, because of the advanced preliminary educational requirements, we have a more intelligent class of men to deal with than formerly and I doubt if the students will readily submit to the drudgery of preparatory work for two years before they are allowed to take up actual practice in the infirmary. Moreover many colleges have built up a large clinic and with the reduced number of students that is sure to follow the inauguration of the four year course, the available clinical material could not be taken care of. It would be an advantage to the student if he were admitted to infirmary practice in the second semester of his Sophomore year.

REPORT.

DR. H. W. MORGAN, CHAIRMAN.

The work of Section I was very much interfered with and did not materialize as we had hoped on account of the limited amount of time that we could devote to it. The room that we were occupying was called for just at the time we really got down to business and before we could even invite the essayist, Dr. Squire, to close the discussion of his paper.

If we had had about five hours' time, I think the work done would have been far more satisfactory to those who were taking part.

ABSTRACT OF INFORMAL DISCUSSIONS.

Dr. Fred Henshaw: It is not feasible to put root canal operations in the Oral Surgery clinic on account of the number of such operations. The students in the Indiana Dental College will have a special white enamel case containing the root canal armamentarium kept in formaldehyde fumes. In the clinic it will be the practice to extract first molars for children when the pulp is found to be involved because of the length of time necessitated by its proper handling and the doubtful results obtainable.

Dr. B. Holly Smith: We should not extract the first molar early because this practice will cause a great amount of malocclusion. It is needed in mastication, and should be retained if only

temporarily. The nomenclature in all branches needs to be harmonized so that we will know what is meant by certain terms and subjects. All the teachers under Operative Dentistry should have conferences. Another great need is endowments to permit proper payment of full-time professors.

Dr. A. R. Starr: Coordination of subjects is very important. In New York instrument making has been eliminated from the Operative Technic course. The student should get into the clinic in Junior year. The curriculum as presented by Dr. Squire is to be commended.

Dr. F. A. Delabarre: Orthodontia should be the foundation of the course and should be taught to the Freshman. It is a basic subject.

Dr. Pifer: We must look toward a conservation of effort and also strive to adapt the methods followed to the capacity of the student. The students need a broader general education because of the broad scope of dental practice. We at present admit students on one standard—the literary, but graduate them on another, namely, the manual.

Dr. Allen: We must give the student more clinical work, in order to turn out better operators. They should get into the clinic before Junior year.

Dr. E. A. Smith: We must broaden the viewpoint of the dental student. The medical man at present has little respect for the dental student or the dentist because of the difference in preliminary training and also because of the lack of a conception by the medical man as to the scope of dental practice. The dental student should be educated along medical lines. He must be able to meet the medical man on an equality. To accomplish this, the first year should be spent in the medical school. Dental training should thereafter be an optional course, like the training of the otologist, etc. The course should lead to the combined degrees of M. D., D. D. S. Remember that education is a training for power.

Dr. Louis Hall commended the essay in its main features.

Dr. J. O. McCall acted as Secretary of the section.

PROSTHETIC DENTISTRY.

DR. G. WALTER DITTMAR, CHICAGO, ILL.

(Read before Section II, A. W. Thornton, Chairman.)

The Proceedings of this Institute have published in them fifteen essays and discussions pertaining to the teaching of prosthetic dentistry and prosthetic technics.

The Commission on Prosthetic Technics has in the past three years, in its annual reports, submitted some startling facts, many valuable suggestions, and a comprehensive outline of what the Commission believes should be taught in a course in prosthetic technics as applied to plate denture construction.

After reading these essays, all of which are good and several of them genuine classics, also the splendid discussions following each, and then carefully studying the reports of the Commission on Prosthetic Technics, I feel that there is little to be added that is worthy of your time and consideration, for in the foregoing writings, all of which should be carefully read by every prosthetic teacher, and especially the younger men, every angle from a general standpoint has been discussed, and while there will be little, if anything, new in what will be presented in this paper, it will be my purpose to "fill in" so to speak, in a rather concrete and technical manner a portion of the outline submitted by the Commission on Prosthetic Technics. In this way something tangible can be presented and discussed and some progress made.

In relation to the particular line of endeavor in which we as prosthetic teachers are engaged it is our function in this Institute, as I understand it:

First—To stimulate efforts along the line of unifying the subject matter to be presented to our students in the different institutions;

Second—To discuss and decide upon the most practical and effective methods of teaching our subject;

Third—To advise the employment of a simple and efficient system of "checking up" on the student as he progresses step by step with his practical or technical, as well as his theoretical attainments.

And to this I might add a fourth proposition though it has to do only with time saving and convenience on the part of the instructor, and that is to install a filing system, simple and practical,

by means of which the completed technic work when received from the student is deposited to be kept until the student graduates.

As regards the first proposition—that of unifying the subject matter that we present to our students—it is evident that a decided advantage would exist from the standpoint of student transfers from one institution to another, if uniformity existed among all of the colleges in presenting every subject, but more in particular that of prosthetic dentistry and technics.

There are *certain fundamentals* which should be taught; there is a *logical time* for *presenting them* and a *logical order* in which they should be presented. If we can agree upon the character of work which will most forcibly impress these fundamentals upon the mind of the student, and also agree upon the time and the order in which they should be presented, we will have attained three most important points in the logical presentation of our subject, which if all schools would adopt (and there is no reason why they cannot all adopt such an outline) then uniformity in presenting our subject will have been attained.

Regarding the second proposition—that of deciding upon the most practical and effective methods of teaching our subject—a volume can be written, and much has been said in the essays and discussions read before this Institute in past years.

To epitomize some of these thoughts, applying to them my viewpoint, they are as follows:

Prosthetic teaching must be divided into didactic, recitation or quiz, and laboratory courses.

The didactic course should consist of not more than one hour lecture or demonstration a week. A good text-book should be owned by every student and the instructor should make a roster which will specify just what parts in the book shall be studied and learned; these lessons to connect step by step with the lectures, demonstrations and laboratory work in each year.

Following the lectures and assigned lessons from the text-book there should be oral quizzes weekly; once a month there should be written tests. For the higher classes, juniors and seniors, supplementary reading should be assigned in other standard text-books than the one adopted for the students' use, and articles in journals which have a connection with the subject in hand should also be assigned. There should be oral quizzes on this reading matter and short essays should also be written by each student. Then at the

end of each semester a written examination should be given on the ground covered.

The laboratory work should, as nearly as possible, run concurrent with the lecture and recitation course. If the class is large it should be divided into sections, and each new technic exercise should be carefully explained by means of step exhibits and the actual demonstrating of the important or new steps in the operation. These demonstrations to a section composed of from ten to twenty students should be given by the principal instructor in a special small room adjacent to the laboratory where he will have teaching charts, step models and appliances conveniently at hand to assist in making clear each point or step in the operation. In this way from ten to twenty minutes are spent with each section and the student is enlightened enough so that with the aid of the technic cards which also assist in guiding him, and the instructor in the laboratory to assist as well as to check each step of the student's work, he should be in a position to make reasonable progress with his laboratory requirements.

Where there are medium to large classes, and there are two or more instructors in charge of the laboratory, the class in the laboratory should be divided into two or more sections, and the instructors should change sections about once a month; in this way each instructor becomes acquainted with each student and each student will have the different instructors. The opinion and gradings of two or more instructors is likely to be better than if only one man was in contact with a student throughout the year.

Where there are several instructors some one of them is likely to be easier to pass than are the others, and this man is popular with a majority of the class. The strict instructor is not popular, though the good student is likely to favor him, but the weak or lazy student will keep out of his way if he can. So it is better to have the class divided into sections, and have the instructors change sections a number of times during the course. The student in a section must consult the instructor in that section. The same policy applies to the recitation or quiz course on assigned lessons, lectures and demonstrations—viz., small groups of students and enough recitation or quiz masters.

What is sorely needed by the prosthetic technic teacher is a text-book so arranged that it might be used as a laboratory manual. It should be arranged in the order that the different exercises and technic pieces are logically to be assigned to each class. While

at the present time there is, in many of the colleges, considerable uniformity in the subject matter that is given in the full course, yet there is a wide variance in the order in which it is presented and the amount of technic work required. If we had a clearly written, well illustrated, convenient sized book—with the topics arranged as suggested above, and the book produced in four volumes, one for each college year, the first two dealing primarily with the mechanical aspect and the other two taking up the technic of construction and also the application of the different pieces to conditions in the mouth, the normal and abnormal, simple and complex conditions that the prosthetic dentist must cope with, we would then be well on the way toward realizing what we should strive for, viz., 1st, uniformity as to the character of work assigned to establish certain fundamentals; 2nd, the time in the course when these fundamentals should be presented, and 3rd, the order, that they may follow in logical sequence.

In the absence of such a text-book your essayist has adopted a system used in several colleges; though *modified* in *form* and *content*, which system in dealing with large classes is a most valuable adjunct in teaching in the laboratory; namely, the use of what I will term "technic cards."

These cards take up in more or less detail the steps involved in the several exercises and technic pieces. For a text-book we use Prothero's Prosthetic Dentistry, 2nd edition. Each student must own a book—Chapters V and VI are first assigned, covering "Definitions of Some Commonly Used Terms," "Impression Trays," "Impressions and Impression Materials." A lecture, recitations and quizzes are given on these subjects. Then card No. 1 is assigned to every student and the laboratory work indicated thereon begun. A similar plan is followed for each card, the object being to coordinate and concentrate the instruction as much as possible.

The technic cards are designed to *teach fundamentals* with *repetition enough of certain features to produce a degree of proficiency*. Each card has a different color, so that the instructor may recognize at a glance whether the class is keeping abreast in the work. The color facilitates the finding of the laggard or the swift workman because his card is of a different color from those which a majority in the class have.

We strive to keep the class together as much as possible, but it is unfair to the rapid, skillful student to keep him back because of the slow action of some lazy, unskillful boy, and it is unfair to the

unskillful boy to take his case away from him unfinished and put him to work on a more difficult operation when he has not completed the previous more simple one. For these extremes these somewhat detailed technic cards are a great aid. We have for the skillful, rapid student, who has made good grades, in all his studies, one or two extra cards, some extra technic pieces, which, if well done, should merit that student some reward in grade or otherwise. A good scheme is to provide him with a model and the necessary materials and have him make "show cases" to be kept on exhibition at the college.

I will append a copy of the technic cards I have planned for the freshman class, College of Dentistry, University of Illinois for 1917.

They are largely copied from cards previously used, card Number 2 being a slightly modified copy of an exercise used in the University of Pittsburgh School of Dentistry.

You will note that in addition to instructing the student as to the successive steps the stages at which the work shall be inspected by an instructor are also indicated. By this method a close tab is kept on the progress of each student which practically insures the work all being done in the college laboratory. A convenient method of checking the cards is to provide each instructor with a conductor's punch, each punch with a different character, so as to indicate which instructor punched the card. The student places his name and number on the card and when his technic piece is completed he places his number on the piece and submits the card and the technic piece to the instructor, who if he feels the work is passable, the card having been properly punched, takes the card and piece from the student and deposits them in a box which occupies a pigeon hole in the filing cabinet and bears the student's number. At least four sections in the filing cabinet are required; one for each class and differently designed numbers should be placed on the boxes of each section of the filing cabinet so that the boxes will be easily distinguished and placed in the proper group in the cabinet. To easily distinguish those students who are behind with their work it is a convenience to pin or otherwise attach a small card to the front of the student's box which will indicate at once, to the instructor, the students who are not keeping up. If the student is two or more pieces in arrears attach two or more cards to his box or a card of a different color. When the work is completed the technic pieces and cards are all in the

cabinet where they are kept until the students graduate when the work is returned to them.

In my opinion the freshman and sophomore years should be applied to *teaching* the student *principally technical procedures*, the *primary object* being *to acquaint him* with the *instruments*, *appliances* and *materials* which he will use, and *to develop manipulative skill* as applied to the art of constructing dental prosthetic technic pieces.

After the student has developed manipulative skill to a degree and has also studied anatomy (general and dental) physiology and histology, also chemistry and metallurgy, he will be in a position to better understand the application of the various prosthetic pieces to actual mouth conditions.

In the junior year he will have the opportunity to apply his ability in a practical way, and at the same time further develop his skill in producing more complicated and exacting technic pieces.

In this year the science underlying the subject of prosthetic dentistry can be well applied, and the student should be in a position to understand the lectures and also his text-books in relation to the scientific aspect. In his senior year when he will devote much of his time to infirmary practice, when he will have had some dental pathology, he must be impressed, *profoundly impressed, with the difference between mechanical dentistry and true prosthetic dentistry;* the difference between the simple *constructing of an appliance* for substituting lost dental organs; *and the placing in the mouth of the patient* a *prosthetic piece* that will do the *least possible harm to the supporting tissues*, from the standpoint of irritation, inflammation, suppuration or caries. The substitute still to be efficient in the greatest possible degree must be constructed so that it will be useful, durable, comfortable, esthetic and sanitary as possible.

To obtain desired results in the teaching of prosthetic dentistry the department must be thoroughly organized; the course must be well mapped out, instruments, appliances, charts, teaching models and a corps of earnest capable instructors all are necessary. There must be coordination in the work. Frequent conferences of the department head and his staff of instructors should be had and the progress of the students and details of the work discussed.

I have given no consideration to two subjects which frequently are merged into the prosthetic course; viz., metallurgy and orthodontia because I feel that both of these subjects are large enough to de-

mand a chair, and while they may be closely related to prosthetic dentistry, they, in my opinion, should be taught by independent teachers, or at least under separate courses.

The freshman course in prosthetic technics to be given in the second semester—nine hours each week—a total of 144 hours, the student having in the first semester studied dental anatomy and some operative technics.

At this point the essayist introduced a very complete set of schedule cards for the freshman, sophomore and junior years. From necessity the detailed instructions and information is very much abridged in this publication. Copies of the cards will be cheerfully supplied to those desiring them upon application to the author.

FRESHMAN YEAR.

CARD NO. 1.

Impressions and casts.

CARD NO. 2.

Vulcanite wedge.

CARD NO. 3.

Upper vulcanite plate. Without teeth.

CARD NO. 4.

Repair plate.

CARD NO. 5.

Upper vulcanite partial plate. Six teeth.

CARD NO. 6.

Replace teeth broken from plate.

CARD NO. 7.

Full upper and lower vulcanite plates.

CARD NO. 8.

Soldering exercise using Bunsen burner.

CARD NO. 9.

Soldering exercise using blow-pipe.

CARD NO. 10.

Clasp construction; band, band with occlusal rest, wire clasps. Modifications.

CARD NO. 11.

Upper vulcanite partial plate, in conjunction with Card No. 12, clasps, gum sections and pink facing.

CARD NO. 12.

Lower vulcanite partial, lingual bar, wire and Roach clasps. To occlude with No. 11.

CARD NO. 13.

Upper and lower anatomical dentures. Double vulcanization.

Your essayist has not had time to make detailed technic cards for the sophomore and junior years, but the following embraces what he deems essential headings for the cards in those years.

This outline also indicates the type of work and the order in which it shall be presented. By having each student construct every detail of each of these technic pieces he will have attained considerable technical ability, and a knowledge of the fundamentals as they apply to the construction of dental prosthetic appliances.

SOPHOMORE YEAR.

Two hundred and eighty hours. Includes lectures, recitations and laboratory course.

CARD NO. 1.

Cast, aluminum; full upper base. Cast, Watts metal; full lower base.

CARD NO. 2.

Swaged aluminum; full upper base. Swaged aluminum; full lower base.

CARD NO. 3.

Use swaged aluminum bases for gum section case. Vulcanite attachment.

CARD NO. 4.

Swaged German silver; full upper base, doubled, wired and lugged.

CARD NO. 5.

Swaged German silver; full lower base, wired and lugged.

CARD NO. 6.

Clasp construction. Roach, open loop; continuous loop and double bow clasps.

CARD NO. 7.

Clasp construction. Cummer, band clasp, cast clasp and soldered clasp.

CARD NO. 8.

Swaged German silver partial lower plate. Lingual bar; saddles wired and lugged. Roach continuous loop clasp with occlusal rest on left first bicuspid. Cummer band clasp on right first bicuspid. Clasps soldered to metal base. Teeth (2nd bicuspids and molars) attached with vulcanite—pink or buccal. (See Card No. 10.)

CARD NO. 9.

Swaged German silver partial upper base, doubled, supplying six anterior teeth, 2nd bicuspid and molars on left and first molar on right. (Keep base as far away from remaining natural teeth as is consistent with conditions) Roach open loop clasp for left first bicuspid and Cummer band clasp for right second molar. (See Card No. 10 for bite.)

Six anterior teeth, facings, backed and soldered to base. Base wired and lugged for posterior teeth, vulcanite attachment—pink gum on left, right molar butted to model.

CARD NO. 10.

Place metal bases constructed as per Cards Nos. 8 and 9 on Master articulator to obtain bite. Arrange teeth for articulation, vulcanize and finish plates.

CROWN AND BRIDGE.

CARD NO. 1.

Two shell crowns; cast occlusal and part of contour; upper first molar and lower first molar, fitted to roots.

CARD NO. 2.

One shell crown; contoured band, swaged occlusal, fitted to root. (Upper first bicuspid.)

CARD NO. 3.

One shell crown; seamless, fitted to root. (Lower second bicuspid.)

CARD NO. 4.

One plain detached post, porcelain crown; fitted to root. (Upper cuspid.)

CARD No. 5.

One swaged cap and plate, soldered, detached post, porcelain crown; fitted to root. (Central incisor.)

CARD No. 6.

One partial band and plate, cast base, porcelain crown; fitted to root. (Lateral incisor.)

CARD No. 7.

One Richmond crown; soldered, fitted to root. (Central incisor.)

CARD No. 8.

One banded, soldered, metal backed, porcelain faced crown; (steel facing). (Central incisor.)

CARD No. 9.

One post and plate, Goslee crown; soldered; two dowels fitted into root. (Upper first bicuspid.)

CARD No. 10.

One open faced crown; soldered. (Lower cuspid.)

CARD No. 11.

One shoulder crown; cast. (Lower second molar.)

CARD No. 12.

One lingual hood crown; cast. (Upper second bicuspid.)

CARD No. 13.

One lower, sanitary 4 tooth bridge; first bicuspid to second molar. Shell crowns, (cast). Cast dummies, soldered to abutments. Made to fit master model.

CARD No. 14.

Upper, 4 tooth bridge; lateral incisor to lateral incisor; central incisors, two pin facings. Lateral incisors, banded Richmond crowns; two pin facings (solder case) made to fit master model.

JUNIOR YEAR.

Two hundred hours, lecture, recitation and laboratory Infirmary practice, all departments, 256 hours.

CARD No. 1.

Lower, six tooth bridge; to occlude (see master articulator).
Cuspids; open faced crowns.
Centrals and laterals; Steele facings.

CARD No. 2.

Upper, seven tooth bridge; to occlude (see master articulator).

Central incisor; Banded Davis Crown, modified for bridge abutment piece.

Lateral incisor; dummy; two pin facing.

Cuspid; Richmond crown, soldered.

First bicuspid; dummy, Steele interchangeable tooth.

Second bicuspid; Richmond, cast, cemented two pin facing.

First molar; dummy, swaged cusp, two pin facing, soldered.

Second molar; shell crown, cast, anatomical form.

CARD No. 3.

Inlay bridge—supplying missing upper lateral incisor and first bicuspid (vital abutments), central incisor; gold filling, or inlay, well anchored, with réctangular notch cut on disto-lingual to accommodate a lingual support from bridge.

Lateral incisor; dummy, Stewart facing; pink porcelain gum baked to gingival, facing stained and cemented.

Cuspid; modified "Carmichael" inlay attachment with two small pins.

First bicuspid; dummy, facing stained with mineral stains, cemented.

Second bicuspid; lingual hood crown.

CARD No. 4.

Full upper, swaged German silverbase, for model requiring cores for die construction. Doubled, wired and lugged. Reswaged.

Full lower; cast aluminum.

Teeth arranged for anatomical articulation with upper.

Use face bow. Register angle of condyle path.

Teeth attached to upper with vulcanite on lingual. Protosyn gum, on labial and buccal.

Teeth attached to lower by casting aluminum directly to pin teeth; labial and buccal protosyn gum.

CARD No. 5.

Upper, partial, palatal bar plate, supplying second bicuspids and molars on both sides. Davis crowns, cemented. Roach attachment with contact spur on right first bicuspid; inlay anchorage. Cummer clasp, with indirect retention on left first bicuspid.

CARD NO. 6.

Gunning interdental splint made of vulcanite (see master model) use face bow.

CARD NO. 7.

Velum-obturator (see master model).

CARD NO. 8.

PORCELAIN TECHNIC.

Bake pink gum to one facing and two vulcanite teeth. With porcelain modify color of vulcanite tooth. With mineral stains modify color of three vulcanite teeth.

CARD NO. 9.

PORCELAIN TECHNIC.

One porcelain crown; platinum cap and irridio-platinum dowel facing soldered; lingual porcelain carved and fused (upper central incisor).

One porcelain crown; all carved and fused; platinum base and irridio-platinum dowel (first bicuspid).

CARD NO. 10.

PORCELAIN TECHNIC.

Two porcelain veneer crowns—all carved and fused.

Upper lateral incisor. Lower central incisor.

This completes the prosthetic laboratory technic requirements for the three years. Throughout much of the junior and all of the senior year, the student is performing practical operations in the infirmary where he is required to make the various types of prosthetic appliances, and there he must be impressed with this important principle, viz., to construct the prosthetic piece so it will do the least possible amount of injury to the remaining natural teeth, if any, and their supporting tissues, and also construct it so it will be useful, durable, comfortable and esthetic and sanitary as possible.

REPORT.

DR. A. W. THORNTON.

Bearing in mind the President's statement that the sectional idea was to be carried out for at least some years to come, let me say that those who were in Section II feel that not as much was

accomplished as possibly might have been. Two or three things interfered. First, the meeting was called for 9 o'clock, but it was 10 before we started. Then there was a little misconception regarding the rooms in which those various sections were to be carried on. Next year if we have the room, and it is promised, I think we shall have the members of the Prosthetic Section at least sit around a table with their models, when, with informal rather than formal discussion, great good will be accomplished.

So without trying to elaborate our report, I will simply say that it is the consensus of opinion of those attending the meeting of this Section that the plan of sectional meetings should be continued.

Unfortunately the formal discussions were not presented in writing and therefore, will not appear in the proceedings. Those who spoke upon the paper were Drs. Ellison Hillyer, P. E. Neil, Abram Hoffman and J. H. Kennerly, Dr. Dittmar closing. In the discussion Dr. J. H. Kennerly made a suggestion which is most valuable, viz., that all our programs are overloaded so that we are touching here and there and not resting long enough at any one place to receive much benefit from the change of air. Therefore I believe it would be a wise move if we would have less on the programs and arrive at some definite conclusion each year concerning at least one particular subject.

TEACHING OF ORAL SURGERY AND RADIOGRAPHY.

DR. THOMAS L. GILMER, CHICAGO.

(Read before Section III. Dr. C. D. Lucas, Chairman.)

Many years were necessary to convince the average dentist that surgery was an essential unit in dental education. In looking back over the past decade there is seen an appreciable improvement in this respect, since both students and dentists are showing increased interest in surgery and surgical pathology. This has been brought about by improved methods of teaching, by better textbooks, and not a little, by a greater earnestness among our teachers of surgery. In addition an impetus has also been given by the great war, since the value of oral surgery has been impressed upon all who have been cognizant of the good work done by the dentists in the great hospitals of Europe. No surgical unit is now complete without its dental corps. This has also advertised to the public the

fact that oral surgery is an essential part of dental education, a fact not heretofore well known. All of these facts must be, and are, a stimulus to the students. Teachers of oral surgery in our schools must meet this awakening by increased efforts for better and more systematic work. Better methods and equipment are demanded at once to meet the new and ever increasing necessities.

It seems fortunate that opportunity is afforded for better training in surgery through the extended course we are about to put into effect. To attempt to train men for the practice of oral surgery in one year is futile. Two years with improved facilities and methods will be instrumental in bringing about better results.

Oral surgery is a part of general surgery. If it is a part of general surgery, then the underlying principles are the same. There is no short cut to gain a knowledge of oral surgery. Surgery of the mouth, jaws and face presupposes a knowledge of the principles of general surgery. Surgical anatomy, surgical bacteriology, surgical pathology and physiology are as fundamental to oral surgery as they are to general or any other kind of surgery. This is a trite statement of a fact, and only reiterated at this time to emphasize it.

In planning the curriculum for a four year course oral surgery must be given the prominence its importance demands. In the past it has been too much subordinated to the mechanical and other branches. Recent developments in the pathological relationship between the jaws and mouth, with secondary manifestation in other organs and parts, have also emphasized the demand for more and better training, not only in oral pathology, but in oral surgery as well. Pathology is taught by the chairs of special and general pathology, but it remains for the oral surgeon to apply and elaborate this subject, if full benefit is to be received. Unification and team work, I would say, are among the great needs in the dental schools. The different teachers work too much in isolation, having too little thought of the interdependence which should be recognized. The teachers of anatomy, physiology, histology, bacteriology, pathology, both general and special, should present their subpects with the thought that there is a direct sequence to follow for which they should prepare the student. Team work can be efficiently brought about only by frequent consultations between the several heads of departments and their assistants in formulating and laying out plans of definite procedure.

In Northwestern we have found that teaching may be most effectively done by a combination of recitations, lectures and clinics,

depending principally upon the recitations and the clinics, the didactic work only laying the foundation for the recitations. Our corps of quiz masters for surgical teaching is composed of assistants from the surgical clinic. In order that all students may have the best possible training the class is divided into small units. The course of study is laid out by the head of the department.

In the three year course we have two clinics a week, a major and a minor clinic. The major clinic is presided over by the head of the department, the minor clinic is conducted by his first assistant. The minor clinic cares for the less important cases. This clinic must of necessity be repeated so frequently that sufficient time is not left the head of the department, should he care for all cases, to properly present and elaborate the more important ones in the Senior clinic. The minor clinic is always held in the surgery at the school, while many of the major clinics are held at St. Luke's hospital. Only ambulatory cases are treated at the school surgery, all others are sent to the hospital, to be cared for by the oral surgeon who is a member of the hospital staff. Hospital experience is essential for the broadening of the student's mind.

It is our intention in the four year course to teach some surgery in both the first and second years. For instance, in the first year we will add to dental anatomy a special study of the maxillary bones and muscular attachments with special reference to oral surgery. In the second year a sufficient number of periods will be devoted to surgical anatomy as a part of the course in general anatomy; in the third year, the principles of surgery and clinics in minor surgery, including the extraction of teeth, and anesthesia: in the fourth year, minor and major surgery.

Since our clinic is large it affords sufficient material for an additional clinic for the third year. This clinic is to be presided over by the adjunct professor. In order that the regular weekly senior clinic at the school surgery may not be omitted on the days when the senior clinician operates at the hospital, the class is divided, one-half remaining for the school clinic with the adjunct professor presiding. That all the members of the class may fare alike, they alternate in attending the hospital clinic. The minor clinic now held for the senior class will be continued in the four year course, but will be divided into small units in order that a more close observation may be had of the procedures.

The extraction of teeth is a branch of oral surgery which has not had attached to it the importance it deserves. Carelessness and

incompetence in this branch of dentistry is a grave source of danger to patients. The teaching of extraction should commence not later than the third year and continue through to the end of the fourth year, in order that students may have had considerable personal practical experience in the removal of teeth prior to their graduation. Extraction of teeth can best be taught in small units. Impacted teeth often require much skill and surgical knowledge for their removal, and frequent demonstration of such cases should be made by the head of the department.

In addition to the surgeon and his assistants, there is present at each of the major clinics one well versed in bacteriology and pathology who utilizes specimens for further instruction of the students. He is the research man. He takes the students in small groups, shows them methods of culture of bacteria received from clinic patients, inoculates animals with these cultures, showing the results, the physical disabilities of the patients having been noted at the time the specimens were collected. This serves to impress upon the student's mind the possibilities of what has happened or may happen to the individual as a result of such infections. He also makes blood counts when needed and demonstrates pathological tissues received from the clinic with special reference to diagnosis and pathological changes, indicated by the specimens, at the same time, and seeks for new and important facts.

Anesthesia is a department of surgery and should be taught by one especially versed in the subject. In our school this is taught by the adjunct oral surgeon. In the four year course it will be given in the third year since its uses are demanded in that year. It can best be taught by recitation and clinic with emphasis on the clinic. Too much emphasis cannot be placed on the immediate and remote dangers brought about by general anesthetics and to injuries done to parts which sometimes follow the use of local anesthetics. We cannot too earnestly impress upon the student body the fallacy that any local or general anesthetic is under all circumstances, free from danger. One cannot but shudder at the reckless way in which they are sometimes employed for trivial matters by dentists who know little of their dangers. When one knows that demonstrations of anesthetics are made in mercantile houses and other places by unskilled anesthetists, with the one aim of selling them, or some new anesthetic apparatus, he cannot but be chagrined when he realizes that many dentists readily accept this kind of training, and put what they have been taught into daily practice. We must offer better teaching of anethesia to offset this pernicious practice.

Students should be taught as soon as they commence their clinical work in the operative clinic to carefully examine the mouth of each of their patients, that any pathological condition present may be discovered. If they find such conditions the patient should be referred to the surgical clinic and the student should follow the case through its course and be given the opportunity to see at close range the further examination and operation thought necessary by the surgeon. He should make all subsequent treatment and follow it throughout its course under the supervision of an assistant to the chair of surgery.

We impress upon the students the importance of history writing.

We believe that all dentists should keep full and accurate histories of all their work for future reference. History wri ing has a broadening effect and cannot be overestimated. At least one lecture should be given in the early part of the third year as a foundation for future practice in history writing. After this, in the diagnosis hour, which preceeds the clinic, the students under the supervision of one of the assistants to the oral surgeon prepare histories of their patients on suitable blanks supplied for their use. Later they prepare histories unassisted. These histories with diagnosis are read in the clinic by the students and such additions and corrections made as may be necessary. All histories are filed for future reference.

In order that the student may accustom himself to the use of surgical instruments while in school, and in order that he may have a suitable nucleus, to which he may add as his needs demand when in practice, we require him to supply himself, as a part of his school equipment, with a small case of surgical instruments. This equipment consists of a scalpel, bistuory, sharp steel and silver probes, dressing, tissue and hemostatic forceps, periostiotome, small currett, groved explorer, scissors, needles and suture material. If a student is taught the practical use of these instruments when in school, he will not, when he enters practice, shrink from performing minor surgical operations which are clearly within his duty.

RADIOGRAPHY.

Radiography is essential to the scientific practice of dentistry in general and not less so to oral surgery. The teaching of radiography is almost wholly a clinical subject. All students must be taught its uses and the technic for exposure and development of films and plates with special emphasis on interpretation. Since it

is needed in the earlier part of the third year I am of the opinion that it should be taught in the first semester of that year, and constantly employed throughout that and the succeeding year. The practice of dentistry without the aid of radiography is a thing of the past. Small machines which do good work are now on the market at prices within the reach of most dentists, or at least small groups of dentists, in communities where there are no professional radiographers and they should be encouraged in such localities to make use of them.

To be a successful teacher of this subject one must be especially fitted for the work. The head of the department in our school is a radiographer by profession and was formerly a dentist. A knowledge of dentistry is desirable if one is to act as a teacher of radiography in a dental school. No one individual can do all of such work in a large school. Our staff includes the head of the department, three assistants and a school nurse, the latter is constantly in attendance. Since the work in this department has increased greatly, we find, at times, that it is necessary to employ additional helpers for the development. In large schools there are usually to be found men who have had experience in photography. Such students, in our school, as may have the time, are frequently employed to assist in developing.

We usually make a full set of radiographs of the teeth of all patients twenty-one years of age or over before any operations are performed on them by students. For patients for whom full sets of radiographs are not made, it is required that exposures be made of all teeth presenting dead pulps, or from which the pulps have been previously removed, before treatment, fillings, crowning, or other operations upon such teeth are undertaken. In all cases of pulp treatment and root filling the student is required to show a radiograph of the case after the root filling has been made before points are awarded.

In the department of surgery, including the extraction clinic, the demand for radiographs is almost constant as an aid in locating foci of infection in the jaws, in diagnosing jaw fractures, and in discovering the location and relation of impacted teeth. Radiographs are also useful as helps to diagnosis in sinus diseases.

In orthodontia radiographs in combination with models of teeth are so helpful in the study of the cases that their use for this purpose cannot be dispensed with.

All of the radiographs are filed and when we have accumulated large numbers of them we expect them to be helpful in supplying information relative to important unknown factors in dentistry. When radiography is used extensively, as we employ it, the expense is great, but we feel justified in the outlay since the results prove its value.

This paper is not presented with any thought that there may not be better methods of teaching surgery and radiography in dental schools. I shall be pleased to receive suggestions and will expect to profit by them.

ORAL SURGERY FOUR YEAR COURSE.

FIRST YEAR.

(a) Combined with Dental Anatomy, a study of the maxillary bones and their muscular attachments in their relation to surgery.

SECOND YEAR.

(a) Combined with General Anatomy, Surgical Anatomy.

THIRD YEAR.

(a) Principles of Surgery, lectures; recitations conducted by assistants in Oral Surgery.

(b) Clinics in Oral Surgery by Adjunct Oral Surgeon.

(c) Anesthesia, lectures and demonstrations in connection with surgical clinic.

(d) Extraction clinic for divisions.

(e) Radiography, lectures and demonstrations.

FOURTH YEAR.

(a) Oral Surgery lectures by head of department and recitations by assistants in surgery.

(b) Major Oral Surgical clinic by head of department.

(c) Minor Oral Surgical clinic for divisions by First Assistant in surgery.

(d) Extraction clinic for divisions.

(e) Anesthesia demonstrations in Oral Surgery and Extraction clinics.

(f) Radiographic demonstrations in major and minor Oral Surgery clinics.

(g) Demonstrations in Research Laboratory.

DISCUSSION.

Chalmers J. Lyons, Ann Arbor

In the past several years before this body, your essayist and I have discussed the subject in hand several times and every time have been quite in accord with each other in the manner in which the subject should be taught in our colleges. I find myself at this time as I have on other occasions rather prone to agree in the main with all the essayist has said or at least with the cardinal principles of his paper, so that an extended discussion of it would hardly seem necessary on my part as it would only mean a reiteration of what the essayist has already said, couched in terms surpassing anything which I could offer.

The teaching of oral surgery in our four year course as outlined by the essayist should be the minimum teaching in every dental school, and if we had time for it, it should be doubled. In the past as the essayist has well said the subject of oral surgery and its allied subjects has been too much subordinated to the mechanical branches and in some schools I am afraid it has been given simply as a means of fulfilling the requirements in the curriculum rather than of primarily fitting the dentist in the recognition and treatment of those lesions of the mouth which naturally fall under the realms of oral surgery. If as a teacher or to instruct the future dentist so that he may perform his full duty to his patients—he must go out of our respective colleges better equipped in pathology and oral surgery than he has ever been in the past.

Now just what is our mission in this regard? Is it our duty as teachers to make oral surgeons? No. The essayist has stated that "to attempt to train men for the practice of oral surgery in one year is futile. Two years will bring about better results." I agree with him perfectly so far as he goes but I have not in the past, neither do I now, believe for one minute that our duty as teachers of oral surgery lies in attempting to make oral surgeons out of our dental students but to impress upon them the underlying principles of oral surgery, so they may be in a position when they go into practice to recognize those lesions of the oral cavity and will be able to instruct their patients as to the best course to pursue. Then with such teaching, if they desire to become oral surgeons they may follow up this foundation work with postgraduate instruction in the same manner that the general surgeon, the rhinologist, the pedatrician and others are compelled to do.

In the University of Michigan we do not follow the text-book system of recitation as they do in the Northwestern. We have not

felt up to the present time that we have an ideal text-book on oral surgery for dental students. Consequently we are following the lecture and quiz system, taking up each subject and trying to incorporate in our lectures the best, in our opinion, from the various texts, upon the subjects, supplementing the work of the text-books with the late writings in the journals upon subjects relating to the course. We believe in this manner our students are getting the last word on the subjects. We all know that the trend of the times is that many writings of five years ago are passé to-day.

Our clinic in the University Hospital affords sufficient material that the students have an opportunity to see the practical side of our teaching in the lecture room. We have one major clinic a week in the University Hospital and five minor clinics a week in the Surgery at the dental college. The minor clinics embrace those conditions with which the dental practitioner comes in contact, and should be prepared to diagnose and treat. In this clinic the students assist and are instructed in removal of impacted teeth, treatment of cysto mouth tumors, abscess curettement, root resection, etc.

Adjoining the school surgery we have the extraction clinic which is in operation every afternoon when the students themselves are expected to extract a required number of teeth for credit. This clinic is in charge of a competent assistant.

I cannot agree with the essayist in beginning the course in oral surgery in the first or second years of the four year course. We feel at this time they are not sufficiently grounded to comprehend such teaching and much prefer they have a foundation of anatomy, physiology, his ology and some pathology before entering upon even the preliminary teaching in oral surgery. I am basing this opinion upon the methods of teaching surgery in the medical schools. In my opinion, surgery in the medical school has the same relation to the graduate physician that oral surgery in the dental school has to the graduate dentist. After they have had the fundamental principles they are in a better position to comprehend the principles of oral surgery.

We believe that the beginning of the third year in the four year course is as soon as the student's mind is sufficiently developed to begin this work. At this time they have had their anatomy, histology, bacteriology and physiology and can better understand applied anatomy. We like the English term applied anatomy better than surgical anatomy. So in our school we are planning to give applied anatomy and extraction of teeth at this time and also the principles of anesthesia.

I cannot commend the essayist too highly in the attitude he has taken relative to the teaching of anesthesia. Our students should be made to see the dangers of anesthetics both general and local so that the impression made upon them will be so lasting that a mercantile house will have little influence upon them in exploiting either a new anesthetic apparatus or a new anesthetic. It seems strange to me that with all of our teaching in the past many dentists still persist in this use of some local anesthetic the physiologic and therapeutic action of which is absolutely unknown to them. What's wrong? It is our teaching and if we expect dentistry to take its place among the learned professions we must improve our teaching along this line.

The administration of general anesthetics is rapidly assuming the role of a specialty and I have been uncertain of late just how far the teaching should be carried in the dental colleges. A prominent anesthetist told me a short time ago that in order to be proficient in the administration of nitros-oxide-oxygen a person should be administering six to eight anesthetics a day. In the average dental practice to-day I doubt if the dentist is called upon to administer more than one or two nitros-oxide-oxygen anesthetics a week and it is the average dentist that we are endeavoring to educate. I am of the opinion that if we give them the principles of general anesthesia and in this we include all, together with a limited amount of clinical experience, and in this, lay especial emphasis on the importance of special hospital training in anesthesia in order for them to become proficient we have done our duty.

I am very much in favor of history writing as advocated by the essayist in surgical cases. If the students are taught to obtain a complete history of their cases they will be more thorough in their observations of mouth conditions.

RADIOGRAPHY.

Radiography has become an absolute necessity in oral surgery. This subject should not be relegated to one who is not, as the essayist says, a dentist. The dentist who is well grounded in oral pathology is preferred, as the interpretation is the all important factor in the teaching of this subject. This subject in our school is taught by a man who has made a special study of radiography and has been a teacher of dental therapeutics for many years and a dentist of no mean ability. While as has been mentioned, radiography is a necessity in oral surgery yet in the teaching of oral surgery we must

not lose sight of the fact that the student is quite prone to rely too much upon the radiograph in making his diagnosis.

In oral surgery we consider the radiograph as only one of several means of making a diagnosis. I believe that the teaching of signs and symptoms of disease is equally important as there are many conditions arising constantly in pathological conditions about the body where the radiograph is misleading and the student should be taught not to rely wholly upon the radiograph.

In this connection the teaching of radiography should be conservative less our students rely too much upon it and lose that great faculty of thorough observation which such men as your essayist had to rely upon long before the radiograph became a factor in diagnostic work.

In root canal work the radiograph is to-day indispensable. In our school a radiogram is taken before and after canal filling and several times during the process of opening root canals if necessary. The student is just as anxious to get a good canal filling as he is a good inlay or crown. The expense is borne by the patient and it is a great satisfaction to both the patient and the operator and we feel that no one factor in our whole teaching equipment is of greater force in making more painstaking operators than is the radiograph.

REPORT.

DR. C. D. LUCAS, CHAIRMAN.

The paper for this Section was read by Dr. Thomas L. Gilmer, Northwestern University Dental School, and discussed by Dr. C. J. Lyons, University of Michigan; Dr. W. D. Webb, Georgetown University; Dr. F. B. Moorehead, University of Illinois, and Dr. T. W. Brophy, Chicago College of Dental Surgery.

(The chairman here included a very complete synopsis of the paper and formal discussion which appear in full in the preceeding pages, from necessity the report has been condensed. The following is the abstract of the informal discussions as reported by him).

Dr. Webb suggested that the principles of surgery should be given in the first year, bacteriology and surgical pathology should be given the second year. In Georgetown University, Dr. Webb gives practically the same course in surgical pathology to the medical and dental students, and he advised us that the dental students

receive the same questions as the medical students, and that their grades are just as high as those of the medical students.

Dr. Webb emphasized the importance of early recognition of new growths, or neoplasms and insisted upon impressing upon the student mind the responsibility of the dentist in this regard.

Dr. Webb called attention to the fact that team-work between the two allied professions is very essential, therfore, consultation between the members of the medical and dental profession should be encouraged.

Dr. Moorehead expressed the opinion that the relation of oral surgery to dentistry is the same as that of general surgery to medicine.

In order to expand the perspective of the oral surgeon who teaches that subject to dental students, Dr. Moorehead insisted that he should have had a medical as well as dental training.

Dr. Moorehead advised us that he was not enthusiastic in having his students observe major oral surgical clinics, including hare lip and cleft-palate. Such time should be spent in case analysis, in which he hopes to teach all the fundamental principles of surgery. His idea is to teach oral surgery to dental students for the purpose of affording them poise and detail in diagnosis.

He advised a careful training for the administration of nitrous oxid, but condemned the idea of his students receiving instructions in the administration of ether.

The Pharmacology of Anesthesia should be definitely taught to dental students in the second year, while demonstrations of practical administration of anesthetics should be given in the third and fourth years.

Dr. Brophy suggested that the dental student demonstrated lack of interest in the subject of oral surgery, and said that the difficulty was in getting the student's mind in the proper frame to study oral surgery on account of their lack in scientific training.

He emphasized that the one thing which the dentist needs most is a comprehensive understanding of pathology.

He was agreed that the most logical way to teach oral surgery was by a practical clinic, however, he advised assigning a text and recitation for lecture hour.

THE TEACHING OF DENTAL HISTOLOGY.

DR. A. HOPEWELL-SMITH, PHILADELPHIA.

(Read before Section IV. Dr. E. A. Bruening, Chairman.)

The general principles which govern the methods of teaching normal, general histology in vogue at a Medical School to-day apply with certain modifications to the instruction in Dental Histology at a Dental School. They should be progressive and didactic as well as practical: they should be expounded by lecture and laboratory practice: they should be elucidated by demonstrations of apparatus and methods of preparing, cutting and staining sections, and illustrated by lantern slides and numerous black board drawings, sketches and diagrams.

A thorough training in normal histology is absolutely a sine quâ non: for without an accurate knowledge of the structure of the elementary tissues, the oral tissues, the blood-vascular system, the nervous system, the muscular system, the glandular and digestive mechanisms, it is impossible for the dental student to intelligently receive instruction in this special and somewhat unique branch of anatomy, to interpret carefully the microscopal appearances which he beholds, and to apply correctly such knowledge to the study of dental histology, pathology and surgery.

As however, the dental tissues differ very markedly from those elsewhere, and as the field of operations naturally covers a more restricted area, students are rendered most fit for the absorption of these principles if, in a large measure, they themselves take part and assist in the actual making, staining, and mounting of sections.

It is obvious that it is impossible for each learner to be allowed the use of a microtome, methods of preparation of materials, etc.; time and opportunity forbid. But he may—instead of merely mounting sections which have been already prepared, cut and stained, as in a medical laboratory—very easily, in class, make sections of the hard tissues during the course of an ordinary morning's work.

It is important at the beginning of a course of practical dental histology, to introduce an intelligent study of the tissues by several lectures and demonstrations dealing with the structure, functions, use, and care of the microscope and its parts, the manipulation of illumination, the uses of different kinds of microtomes, the measurement of objects and the delineation and photographing of the same. A student so taught is better equipped than one whose knowledge

in these matters is wanting, and if this has not been done at the commencement of his studies in normal histology, it should be taken up at the beginning of the course of dental histology. A complete comprehension of this, as also a knowledge of the structure of the common organs and tissues of the body generally is thus not only essential but pre-supposed.

A properly equipped laboratory for teaching dental histology contains teak-topped benches fitted with lockers and drawers, a number of individual compound microscopes provided with 16 m. m. and 4 m. m. objectives, and a series of wooden stands holding a set of re-agents in bottles. These for ordinary purposes should comprise Ehrlich's acid haemotxylene, eosine, Orth's borax carmine, gentian-analine-violet, absolute alcohol, denatured alcohol, Gram's iodine solution, xylol, Farrant's medium, and Canada balsam.

The student's own equipment is put up in the form of a wooden box, and contains slides, cover glasses, labels, carborundum hones, watch crystals, mounted needles, section lifters, brush, absorbent paper and soft cloths, and he should also possess a text-book and a rough note book with a loose leaf drawing book.

The course of practical instruction may be conveniently divided into three parts: (A) The hard and soft dental and maxillary tissues, (B) Dental development, and (C) Common pathological affections of the teeth and associated parts.

Bearing in mind the lack of individual training in the making of sections which obtains in a medical school, it is advisable, as the first exercise, to progressively instruct students in this art. This is conveniently accomplished by providing the class with specimens of the teeth of a small carnivore, say cat or dog. Each student receives in a watch crystal such a specimen which has been previously reduced on both sides on a carborundum stone on a motor lathe.

He is able, by the help of the graded carborundum hones, at the end of fifteen to thirty minutes to produce a sufficiently satisfactory section for dehydrating, "clearing, and mounting." Thus he will probably rapidly acquire a degree of fine, digital dexterity which he will discover to be extremely useful in future manipulations in the oral cavity. He will at once become interested in the work and anxious to ascertain the results of his labors, and ultimately to acquire a varied and valuable collection of interesting and important sections. In addition, he unconsciously learns not only the histological features of the hard parts, but also other aspects of the physical characteristics of enamel, dentine and cementum.

Reference to and the study of text-books such as the author's, "Dental Miscroscopy" and "The Histology and Patho-histology of the Teeth and Associated Parts," give him the rules of procedure and modus operandi, and descriptions of the various elements in the tissue he is to look for and expect to find.

The further material required for laboratory work will include the following: Young, human teeth unaffected by caries or structurally altered by senile variations, unstained, as well as stained by means of colored collodion. Teeth, having been previously cut in both horizontal and vertical directions by a diamond disk on a lapidary's wheel, at an average thickness of 1 m. m. are placed in 30 per cent alcohol indefinitely to prevent brittleness and cracking of the enamel and dentine. When staining of the hard tissues is required the saturation or infiltration in a solution of colored collodion should be begun at least three months prior to the date of the opening of the class. Long as this may seem, it is impossible to overstain the parts. The minute structure of enamel is also rendered very clear by washing a thin ground and polished section in five per cent hydrochloric acid on the slide, and, after neutralization staining with one of the haematein group of dyes. The shell of *Pinna* is homologous with enamel, and is of value in exhibiting the shapes and structure of the enamel rods of man.

Successive preparations of the hard and soft parts in combination are to be made of the pulp in situ, prepared either by Koch-Weil's or the author's decalcification method or both, the nervous system of the human pulp, the alveolo-dental membrane of man, absorption of the roots of the deciduous teeth, the dentine cementum and pulp of the deciduous series: and of the soft parts, the hard palate, the soft palate, the gum and the gingival trough of man.

Dental histo-genesis in mammals is best studied for class purposes, in the jaws of the child at birth, rat, and pig embryos of 3, 7, and 7.5 c. m. in length, and development of the teeth in fishes and reptiles in fresh *Gadus* and the *Ophidia*.

The third part of the course consists in the study of the results of pathological processes in the teeth and jaws. Included in these preparations must be material illustrative of Inflammation of the Periodontal Membrane, Hypoplasia of the Cementum, "Caries" of the Teeth, and Tumors of the type of fully-formed connective tissues and Tumors of the type of the epithelial and immature connective tissue.

The methods of distributing preparations to the class vary from those adopted in the medical school.

It is obvious that the sections dealing with the hard tissue can be given out without much care in handling. But sections of the pulp and other soft tissues in situ must, after being cut on an ether-freezing microtome operated by compressed air, be distributed from water contained in trays of black vulcanite or zylonite, and kept in different solutions till wanted. They are received in water in watch crystals and passed by the student through the various stains also contained in watch crystals. Finally, they are mounted in Farrant's medium for choice, for by using this mountant the dehydrating and "clearing" effects of alcohol and xylol are avoided, and the sections are not liable to be injured in this respect. For those of the developing tissues imbedding and mounting in balsam are of course indicated.

In conclusion. In view of the importance of the study of dental histology, pathology and bacteriology to the student and practitioner, and in view of many problems which still await solution at the present day, it is to be hoped that this subect will find a universal place in dental curricula, and that a compound microscope and accessories will be added to the requirements of the equipment of those about to study the science and art of dental surgery.

DISCUSSION.

Dr. Kurt H. Thoma, Boston

I can heartily endorse Professor Hopewell-Smith's statements and his emphatic appeal for a thorough course in Oral Histology and Pathology. This is very much needed and of great importance in the development not only of our students, but of the dental profession.

The new developments in dentistry have resulted in a much closer coordination between our specialty and medicine, and in our new four year course we not only give the students more experience in the mechanical part of dentistry, but allow time for medical subjects and for a broader scientific foundation. No other course gives the student more fundamental knowledge upon which to build and develop medicinal and surgical therapeutics than microscopic study of the normal and diseased organs and tissues of the mouth.

In Harvard we have planned to have such a course given in the second semester of the second year. The students at that time have

completed the courses in general anatomy, general histology, general bacteriology and pathology, as well as the special course in dental anatomy. We shall give them lectures and laboratory exercises twice a week for four months (128 hours). The lectures will be complimented by stereopticon pictures explaining the material to be studied in the laboratory. I am now making most photomicrographs by the Lumiere process, or colored photograph. This gives the students a much better coordination between screen and microscopic pictures.

The method of laboratory teaching in our school is somewhat different from that which Professor Hopewell-Smith has described. Our students have been fully instructed in the preparation of slides for microscopic examination in the general courses in the medical school and are supposed to have a general knowledge of this technic.

The student who is especially interested in this branch and intends to become a research worker has opportunity for special instruction in the use of the microtome and the photography of microscopic pictures. I intend to follow the same method of teaching which has been introduced by the late Professor Minot in the general course in histology and embryology and has proven very successful. Instead of distributing to the students unmounted sections, they receive a box containing typical mounted specimens which are to be studied.

This same method I have followed in Dental Histology and shall continue to use in the extended course. The students are to study these specimens first and then make a drawing of the whole organ or specimen and as many high power drawings as are of interest. The drawings, which are handed in, not only give a good idea of the amount and quality of the work individually accomplished, but also of the understanding and knowledge which each student has gained by his study. This method has the advantage that the sets can be used every year and are the same every year (except for additions), and that it does away with the large amount of work required to collect and prepare a sufficient number of specimens each year, some of which cannot always be found when they are needed.

I also divide the course in three parts, namely: 1—The study of normal histology of hard and soft substances of the teeth, the hard and soft substances of the jaws, the palate, lip and salivary glands. 2—The study of the development of the face, teeth and salivary glands. 3—The study of the diseased oral tissues, taking up all

the pathological changes of the hard tooth substances, of the pulp and periodontal membrane, of the hard and soft tissues of the mouth and jaws, of the salivary glands and lymphatic system and ending with specimens of the various benign and malignant tumors.

I feel that it is not only permissable but very advisable in a highly specialized and limited field like ours to give oral histology and oral pathology side by side in one course and I am sure that such a method, which allows comparison of the normal and diseased tissues, will be greatly appreciated by our students.

HISTOLOGY AND THE FOUR YEAR COURSE.

DR. NEWTON G. THOMAS, CHICAGO.

In the presentation of this paper I act in accordance with the advice given by the authority delegated to me with the request. The subject of Histology is to be presented with relation to the four year course. The presentation involves many interests and phases, but I have chosen only such as I deem of major importance. It will be far from me to be or even appear didactic in this presence; I hope merely to mention some of our mutual difficulties and make suggestions for their removal, to call to view some of our ideals and mention means for their acquirement. What I say in part may well be said of other subjects in the same relationship, but that only emphasizes the need of saying it.

The fundamental reason for the four year course is to raise the standard of dentistry not to the height it must eventually reach perhaps, but as much higher than it now is as can be done at this time, as well as to enable the schools to contribute to the great ministry of the profession men with better training and greater fitness than their predecessors have had, and this necessitates a consideration of the man of the past as well as an expression of what we shall expect of the man of the future. In making the comparison, it is done with due respect for the men who come to us for the three year offering of the schools and no inference is made to bemean him. I choose a representative of the class that is now enrolled in the schools who has presented what credentials are required for matriculation. His lack of the rudiments of the common branches, his inability to concentrate, to give attention, his smattered knowledge of the subject he has had and the weakness of his grasp, force themselves upon one daily. He has been censured often, but he is not wholly at fault. He is in most instances the

victim of an over-filled curriculum and of a system that is fundamentally wrong. Election is a dangerous expedient to put into the hands of a child, proof of which is before us in the foregoing description. Life is not so wholly elective that a 15 year old boy needs practice in choosing. Rather, its difficulties are so many and long that a boy needs exercise in application and determination when choice, task, and aptitude rebel the most. Although there is a modicum of science taught in the public schools our representative has not elected it, or, if he has, has not taken it seriously.

The next feature plainly apparent is the student's attitude toward his profession. In all probability he has not considered it as his future life work while in the secondary school, and so has laid no foundation for the superstructure to be erected in the professional school; or, if he had so determined, his life occupation, he did not know what to elect to best fit him for the advanced course. Sometimes he has been advised by a practitioner whom he has consulted *that the sciences are of secondary importance* when compared with the "practical work," and to get the latter at all costs. Thus he comes often with no preliminary preparation and a lot of indifference. To supply that preparation and teach Histology at the same time has been attempted but cannot be done, and to remove that indifference is often impossible.

Next the student finds himself in an atmosphere in the school savoring so much of mechanics and mechanical procedures that he works on the basis that a passing grade is all he desires in the sciences and bends to the acquirement of the technic of practical dentistry. The removal of this impression is possibly the hardest task of the science teacher. In his freshman year the student is ushered into a laboratory where he begins taking impressions or carving teeth or similar procedures. A question never fails to evoke the reply "I enjoy prosthetics much more than histology" although he cannot understand just why he must repeat and repeat his impression taking or re-carve his teeth. I accord most heartily with a statement made before this body in its last session, that we should "train men to think before we teach them to do."

Now it seems to me that the professional schools in conjunction with what legal consent is necessary has some right and some responsibility. It has the right to prescribe the requirements necessary for matriculation to its courses. It should state, and that unequivocably, what an applicant must have had preparatory to a course in dentistry. This would make such an applicant consider the profession in the selection of his high school and college work.

He would prepare for dentistry and not go into dentistry as a second choice to medicine which would require so much more preparation. His approach would not be that of a man who wanted a ready made means of making a living handed to him on a tray. This would lead men to expect a scholastic atmosphere in the school they entered and such a school ought by all means to have in it such an atmosphere. When such prevailed, students would approach their profession, reach for their diplomas with gravity, and appreciation of the seriousness of their life work.

Also, it seems to me, dentistry must offer to the world men who can mingle with and can command the respect of men of kindred professions. We have been told often of late that dentistry is invested with a tremendous responsibility. Our schools should give such a training that the men they graduate can shoulder that responsibility unembarrassed. I have no patience with the thought that dental schools cannot train men fit to meet the needs of the hour. Scientists there are and have been who had neither an M. D. or a D. D. S., and scientists there have been and are who with only a dental degree to their names have made large contributions to science. This responsibility rests heavily upon our schools, at this time, more heavily than ever before.

The teacher is certainly of some interest in this consideration as well as being a veritable something for which the school is responsible. My presentation might seem Utopian to some, undesirable and impracticable to others, but, teaching is a profession separate and apart, a profession for the perfecting of which curicula have been composed and schools established. It has always seemed to me that the student has been bemeaned very often when his poor work was the result of poor teaching. It does not always hold that a man who knows a subject well is necessarily a good teacher. Neither does it appeal to me that a man whose interest is first in an office will put into his teaching all that it and the school deserves and the student pays for. I have always felt that teachers of purely scientific subjects should be trained as teachers of those subjects and not necessarily men of dental training. Neither am I convinced that such a teacher would be lacking in interest in the superstructure for which he is laying the foundation.

Intimately related to the teacher are his assistants. The men who aid a department head in the teaching of his subject should likewise be interested in the principles of pedagogy. It may be possible that a school exists within a school, and that men who for any reason find connection with a school to their advantage be held

to certain requirements. In addition to interest in the subject they should be taught in methods deemed best for its presentation. An inefficient instructor may easily make a laboratory little more than a waste of time, and a quiz in the hands of such a man, the cause of hopeless confusion.

The subject has been regarded as a hard one. Students soon learn that there are certain studies to be dreaded and Histology seldom fails of selection. In my experience it has always been so denominated. Two explanations obtain—the first is the student's preparation; the second is, the presentation. We often speak of aptitude and say men incline to subjects naturally. Doubtless this is true but I fancy that it has been overworked. To make a subject interesting is the best possible pedagogy. Men of aptitude take to subjects in spite of poor teaching, but it has always appealed to me that a living being would be, I mean, could be, interested in living things. To appreciate and to take interest in Histology a man must be interested in life forms and life manifestations, and interest will impel men to undertake difficult tasks.

This implies one study at least necessary to prepare men for this branch. The writer agrees heartily with Dr. Noyes in his communication to this body one year ago, that previous to Histology, should come Biology, Chemistry and Physics. Also I would suggest that he be required to present more than the secondary schools afford. His work should be that of college grade. This would relieve the burden placed upon teachers of Histology now, of stating and restating the rudiments of Biology, explaining the alphabet of laboratory technic and naming the parts of a microscope. Likewise could he accomplish his proper task with much more expedition and thoroughness in less time.

With this also arises the question of position in the four year schedule. We are assuming that the dental school is equipped to teach the branches it requires for a dental diploma. It is my judgment that in the work of the extra year we are requiring we should teach and teach as well and thoroughly as it is or could be taught elsewhere. This places the first year of Histology in the second school year. That Histology should precede Pathology is evident enough to require no explanation.

A question arises as to how thorough we should be in our presentation of the subject. I feel that we should make the course as complete as that given by the medical schools, if possible. When this is not possible, then the course might be modified to the elimination of the Central Nervous and Reproductive systems or a

modification in the thoroughness of the work covered. As we increase our requirements these professions draw continually nearer, and the number of men who will take medicine after dentistry will increase. There ought to be no occasion for the repetition of Histology in the medical course.

The structures forming and occupying the mouth cavity should have more attention than is given to them in the medical schools. The dentist should be conversant upon the minuteness of these parts. The work on these structures should extend through a semester at least, and have the best training the student can bring to it. It seems that the place for Dental Histology should precede or be synchronous with the work in operative dentistry and previous to oral pathology. The clinic should be denied to men who have not had Dental Histology.

The methods employed in teaching Histology will depend upon two factors—the size of the classes and the teacher. In general, however, they will be the same—lectures, quizzes and laboratory periods will be the component parts. When the classes are large the lectures become the least important factor. Unless lectures are close together, they lose much of their worth and are scarcely valuable at all except to introduce new subject matter, or to inspire the classes. If the classes are small and the work is done on successive days till it is finished, the lecture is serviceable for it can always be on the subject to be immediately put before the class. But if a man goes to the laboratory once a week the lecture falls short of its purpose unless given immediately prior to the work of the day. The foregoing reference to the inadequacy of the lecture applies to classes so large that they are divided into sections, each section entering the laboratory weekly.

The most important factor in the acquirement of Histology is the Laboratory. Methods here may vary, but the importance of the work done remains paramount. Here the lecture, or better, a dissertation becomes of value. Here demonstration with crayon or projectoscope and slides becomes effective. But, to make the laboratory work fully profitable, the student must have studied at home previous to the work of the day. Without this the preliminary presentation by the teacher is only partially successful and the actual work becomes drudgery with scarcely any educational effects. Homework is an ABSOLUTE necessity. To get this and to get the other results desired the work ought to be pursued DAILY AND NOT WEEKLY until completed. The number of men per instructor in the laboratory ought not to exceed a score,

and with him ought to be a man capable of teaching the rudiments of drawing. In the school I represent the work done daily is collected, and if passable, is filed. If not passable it is returned and must be done again—in the laboratory. The work of the day is suggested only in the briefest possible form on the board. Stenciled directions, if at all full, have been found to be, too often, a source of temptation to the student. This plan compels a study of text and specimen together in a most profitable way. Specimens are given to the students already mounted and only a little of staining and mounting done. Laboratory technic is so easily forgotten that it must be acquired a second time if a man desires to follow it further—and books on laboratory methods are guides quite easily followed.

Quiz work ranks next in importance. The quiz should be as nearly as possible in accord with the laboratory work. This procedure keeps the men in constant touch with his text, a task difficult of performance otherwise. By these methods the student should be so familiar with tissues and organs that Unknowns would have no terrors for him.

The foregoing treatment of methods is based very largely upon the plan followed in the school I represent. There we have the problem of the high school graduate as he is, and the large class. While some of the work we are doing, both in subject matter and plans, is experimental, we have found the solution suggested very effective. The magnitude of the class in the four year course is yet to be seen, but there can be no doubt that results will be appreciably more gratifying and the labor expended for obtaining this far less onerous.

REPORT.

DR. E. H. BRUENING, CHAIRMAN.

This section convened Thursday morning at nine o'clock to hear and discuss two papers, one by Dr. Hopewell-Smith, University of Pennsylvania, Evans Institute, and one by Dr. Newton Thomas of Northwestern University Dental School.

Dr. Hopewell-Smith's paper dealt with the teaching of the subject of Dental Histology, dividing it into three parts: (A) The hard and soft dental and maxillary tissues, (B) Dental development, and (C) Common pathological affections of the teeth and associated parts.

He took up the preparation of the specimens, in detail, reference works and something in regard to what the student should know about the fundamental work and instruments.

This was an excellent paper and should be carefully studied by all teachers of the subject.

Discussion was taken up at length by Dr. J. B. Stein, New York College of Dentistry and by Dr. Kurt H. Thoma, Harvard University. These discussions have been written and incorporated with this report. Dr. A. R. Starr of New York College of Dentistry, Dr. J. O. McCall of the University of Buffalo, and Dr. H. M. Semans, Ohio State University, also took part in the discussion.

Dr. Newton Thomas's paper dealt with the subject in a fearless way and he showed that he had been studying teaching methods from many angles. Read it carefully. The discussion of this paper was general and not given the amount of time we would like to have devoted to it.

The chairman exhibited the work of Dr. J. S. Foote, Pathologist of Creighton University. This consisted of a "Constructive Method" of teaching histology in which the student uses a set of cards arranged in the form of an arc of a circle to represent the tubes of the body. Each kind of tissue is diagramatically represented by a piece of card board of a certain color. In this manner he can construct any organ or structure of the body by the building up process, much as a child builds with blocks. A complete set of charts and diagrams accompanies each set. A large wooden set of the same kind are used in the lecture room. Dr. Foote's or any other text-book may be used with this method. The same author has made complete sections from the center of the shaft of about seven hundred femur bones for the study of the comparative histology of this tissue, much of this work was done in the New York Museum of Natural History and in the department of Anthropology of the Smithsonian Institute in Washington. A complete tabulation of drawings, measurements and descriptions of the bones has been printed by our government as one of the series of "Contributions to Knowledge." Its title is a "Contribution to the Comparative Histology of the Femur," edited by Dr. A. Hrdlicka, Washington, D. C. This work can be obtained by applying to the Institute. Reconstructions were shown of the three types and their most common combinations, carved in plaster by freshmen dental students.

THE TEACHING OF MATERIA MEDICA AND THERAPEUTICS.

DR. EDGAR D. COOLIDGE, CHICAGO.

(Read before Section V, Dr. E. H. Long, Chairman.)

It is with much fear and trembling that I undertake to present a paper on this subject for the Institute of Dental Teachers. I have attended many of these meetings and each time have gone back to my work with new ideas and inspiration, but I have not absorbed and digested in such abundance that I feel equal to the task now before me.

The teaching of this subject, which also includes pharmacology, is one of unusual interest and almost boundless possibilities. Founded as pharmacology is upon definite lines of research and systematic experiment work, it presents such a vast amount of material to begin with and such unlimited fields yet to conquer, that great interest and hopefulness should attend the pursuit of this course. Any subject to be taught successfully must be made both interesting and practical and should be a pleasure to those engaged. The course should always be within the comprehension of the student, and yet he should be brought to see the possibility of further investigation. Too many opinions tend to leave the student struggling without a solid foundation to stand upon, however, it is also quite possible to give too brief an exposition of a subject and not accomplish the object of the course which should be to give the student a thorough understanding of drug action and to stimulate his desire for making careful observations, complete records and correct deductions. This will, it seems to me, leave the student in a position to carry on further work along various lines of thought after he enters upon his profession.

MATERIA MEDICA.

The teaching of materia medica is rather a difficult problem in that it is mostly a matter of committing to memory a great many terms, definitions and characteristics of drugs. The human mind is limited in ability to retain for any length of time a great deal of learning gained by memorizing. If ideas can be fixed mentally by some process of association, it will be much more possible to recall them when wanted. I believe that it is neither necessary nor advisable to spend very much time and effort in the pursuit of this study except in special instances. It is a very valuable adjunct in this work to have samples and illustrations,

beginning with botanical illustrations of vegetables and plants from which drugs are prepared, and samples of crude drugs with all the drugs which are prepared from them, placed in glass bottles and specimen jars in glass cases where the student may go to study and examine them to learn the characteristics of them and record them in his note book. By such a method of study the student may learn by association of various senses the facts he would have to commit to memory otherwise, and since there are many definitions and other nomenclature to become familiar with it does not place so severe a demand on the student's memory. It is difficult to retain much learning unless it can be clinched by some method of association.

The first instruction in prescription writing can be well placed close to the beginning because of the need for much practice in this work, and it can be continued on through the remainder of the course. I am convinced that the most effective teaching of prescription writing can be obtained by omitting the use of Latin. There is no argument that I have seen or heard that appeals to me as important enough to spend the hours of time and the great amount of energy required to get a creditable showing in this work using Latin. I do believe both metric and apothecaries' weights and measures should be taught. In the Journal of the American Medical Association, of May 27, 1916, may be found an article on prescription writing in English in which a report of the examination of 10,000 prescriptions from 100 leading Pharmacists over the country showed less than one-half were written in correct Latin. It showed 36 per cent were written in English, and 18 per cent in poor Latin. Now with the limited time we have in the dental curriculum for this subject, and the limited practice and use for prescription writing at best for the average practitioner of dentistry, I believe no time nor effort should be expended by the student in learning to write prescriptions in Latin. Surely a prescription written in good English will carry more dignity and credit to our institutions than a prescription written in poor Latin, as a large percent are sure to be if we attempt to teach Latin.

PHARMACOLOGY.

The question always comes to the department, how much of this subject should be taught to the dental student? This question is hard to answer and perhaps each one must answer it who teaches it in accordance to the time allowed in the curriculum for this subject. I personally feel that much more time could be spent to great advantage to the student in the study of pharmacology.

As the study of Latin grammar always strengthens the student in English grammar and in construction of sentences, so I believe that the study of pharmacology is of great value to the dental student in clinching many important points in physiology and pathology, both of which should be studied previous to this course. Cushny states in the introduction of his text-book on Pharmacology and Therapeutics that "Pharmacology is really a department of biology, very closely related to the other sciences included by that term. Thus, as physiology is the study of the life of the normal organism, pharmacology is the study of the organism rendered abnormal by drugs, while in pathology the phenomena of life under disease are examined. All three subjects may be pursued without reference to the practical needs of medicine, and all three are closely interconnected and mutually dependent, for, in many instances the normal condition of an organ can be recognized only by considering the result of its destruction by disease (pathology), or of its paralysis by chemical agents (pharmacology)." If the drugs to be studied in this course are limited to just those that are to be used in the practice of general dentistry, it cannot be expected that it will develop the student of today to meet the ever increasing demand in knowledge and skill that he will find awaits him when he enters this profession. Although the number of drugs which are required in practice is diminishing, the need of a greater knowledge of those drugs is increasing. It is more important to thoroughly understand drug action for the ability to *choose and eliminate* than it is to select for study only those drugs a student needs in the practice of general dentistry. In the past I believe many of our students have gone out deficient in knowledge and training in drug action, and have used antiseptics, caustics, astringents, etc., because they were called good antiseptics, caustics, astringents, etc., rather than to thoroughly understand the pharmacology of the drug in its broadest sense which is the study of the *changes* which occur in the vital reactions of healthy and diseased tissues under the influence of drug action.

How is pharmacology to be taught successfully to dental students? I am not presuming to be able to answer this question by any means. However, it seems to me at this time that the more thought one spends on this problem, the nearer he will come to the belief that actual demonstration on animals is very essential if not indispensable to the greatest success. I firmly believe it to be a mistake to pass such subjects as local or general anesthetics, stimulants, depressants, etc., without a considerable amount of time being spent either by demonstration to small groups or by

individual student work with animals. Not only will this type of instruction bring more positive results but will encourage a desire for original thought and research along pharmacologic lines.

In the Journal of the American Medical Association, September 6, 1902, Dr. Torald Sollman, of the Western Reserve University, Medical Department, has stated that "pharmacology is peculiarly a laboratory subject," and in a great majority of the medical schools the subject is given largely that way. It may not be essential to devote the same amount of time in teaching our students this subject, as do medical schools, but no doubt they could receive more of this kind of instruction to a decided advantage.

Class work should be largely recitation and conference with a goodly proportion of written tests. The tests should be given to offer every man the opportunity to recite and to allow him to see the value of his thought when the papers are returned after grading. Lectures should be short and generously supplemented with lantern slides. The class will accomplish more by meeting at least twice each week, as the student will retain more of the subject than where a week passes between meetings. The study of pharmacology should be a pleasure to the student and the more time that is spent in becoming familiar with the changes induced in the living organism by the administration of drugs, the more confidence the student will have in his ability to control his patient under all circumstances and conditions, and the better able he will be to cope with the varied requirements in the practice of dentistry.

THERAPEUTICS.

The greatest good that can possibly be done in teaching this subject, in my estimation, is to impress the student with all the possibilities of preventive methods and all the possible ways of applying prevention. It is an old saying that "an ounce of prevention is worth a pound of cure," and one that should be the motto of every department. It might be said that if prevention is the most important, why spend a year or two of hard work bottling up the drugs for the difficult subject of pharmacology, only to leave the stoppers in forever afterward? Let me again say that it is a wise man who knows when to use a drug and how to use it when it is indicated, and what results may be expected when it is used. If the indication for a certain drug may appear only once a year, the man who recognizes the condition and is prepared to treat it is sure to meet with greater success than he who stumbles along.

In teaching preventive methods in therapeutics it is necessary to reach over into other branches of the curriculum to illustrate, to correlate and to apply. The cause of an area of gingivitis may be found to be about the band of a crown improperly adapted or in a faulty contact between two fillings or crowns and often a pyorrhea pocket of long standing can easily be accounted for in this way. To begin with a given pathologic condition and prescribe treatment without some reference to the cause of such a condition would be inconsistent with good teaching. It is necessary to begin with a cause and follow up its disturbance which results in a condition for which as a therapeutist one may be called upon to prescribe treatment. Many times the removal of the cause will eliminate the effect and resolution will follow without further treatment.

MOUTH EXAMINATIONS AND RECORDS OF TREATMENT.

It is important that a student should be given much experience in making complete examinations of the mouth and recording every pathologic condition present, which, as is well known to anyone who has made a continuous practice of this procedure, requires not only considerable knowledge of diseased conditions but also a knowledge of the conditions only *deviating slightly* from normal, which are beginnings of grave trouble, as well as to require the closest kind of observation to recognize these as causes of future pathologic conditions when present. For this purpose I know of nothing so valuable as the chapter on "Examinations of the Mouth" by Dr. Arthur D. Black, in the text-book on Special Dental Pathology, by G. V. Black, in which he gives a chart and tables of markings to be used in this work. By years of observation and thought along this line and by making many hundreds of such records, he has worked out this plan of markings, simplified by the use of the decimal system, which greatly facilitates memorizing and thus saves much time in making such records. I believe the value of this is so great that each student should become familiar with the tables and should begin to make examinations and preserve records from his first entrance to the clinic. If such a requirement is enforced at the beginning of the clinical work the student will have opportunity to become quite efficient in examinations and will develop a much greater habit of observation than if this work is done for him until he leaves the school. Of course the examination record should be followed up by prescribing the treatment in each case and complete records should be kept of such treatment. This work does not involve as much red tape and loss

of time as might be thought by one who has not had experience with it, and surely the advantage to the student will justify the additional work. For instance, consider for a moment the value to a student of having a complete record of the treatment of a patient who had reported at the clinic several years in succession. In the medical clinic one would certainly expect to find such a record of a patient, and without such information the physician would be greatly handicapped. Some cases of diseased oral conditions justify a complete history and general medical examination of the patient, together with the complete mouth examination, which may be referred to year by year, thus furnishing along with the records of treatment a mass of information which is invaluable in the making of accurate deductions in therapeutics. This habit will also stimulate a desire among the students to follow up further investigations. If the department can operate a research laboratory in connection with the clinical work, it will be a great uplift to the entire profession. Surely the place the ambitious members of the dental profession should look to for advance information and results of scientific research should be to our Colleges of Dentistry and not to the dental supply houses conducting courses of instruction on various lines of dentistry for advertising purposes. The scope of our work should be broad enough, and the teaching force competent enough, to satisfy the demand for information of the present time. If we scorn the effort of those who seek to learn more and who have passed our doors, we are not fulfilling our mission, and again, if we do not approve of the methods by which such men are seeking instruction we should offer the instruction which they need. The latest reports from research laboratories, as well as new methods of operating, should be offered as postgraduate courses, or bulletins should be issued for graduate men to follow in study.

OPERATIONS ON THE PULP AND ROOT CANALS.

One of the greatest advances in recent years is seen in the attitude of the profession toward the treatment and filling of root canals. The teaching of pharmacology has brought about a more careful use of drugs in the treatment of the pulp and pulpless canals. Had not the investigations of the past few years brought out the seriousness of the chronic alveolar abscess at the apex of pulpless teeth, most of which teeth show by radiograph imperfect root canal operations, possibly there would have been a much slower awakening to this much neglected branch of dentistry. Nevertheless, having awakened to the situation as it is and with

the effort of every teacher of this subject doubled and trebled to teach better methods of technic that the mechanical part of this work may be more perfect in the future, our thoughts are being constantly directed upon the drugs used in these operations and we return again to pharmacology to find safe treatment. This field for investigation is very fertile just now and the ear and eye of the profession are much more receptive than for some time in the past for facts. A very much more careful use of caustics, astringents, antiseptics, etc., must be taught than has been common in the past.

In teaching the clinical part of pulp and root canal operations there must be careful cooperation and understanding among the members of the department. As much of the work as possible should be delegated to special men who can devote much of their time in assisting and checking up the work. The department of radiography should cooperate in this work to a very large extent, not only to locate lesions, but to teach the student the inseparable relation of radiography and good root canal work. *No root canal filling should be passed without a radiographic record.* If the student is required to radiograph his root canal fillings while in school he will be well trained in this work by the time he graduates, and will doubtless be so accustomed to depending on the radiograph as a *proof* of his work that he will continue to use it and thus maintain the standard of his work at school.

DEPARTMENTAL ASSISTANTS.

The staff of the department should include enough assistants to allow much personal attention to each student. In the clinic the work should be distributed so that some instructors are responsible for the root canal operations, and others for the treatment of the gingivae and peridental membrane. The instruction in class rooms cannot all be given by one as well as by having certain parts of the work assigned to assistants. One should be kept in training to be able to take the work of the head of the department at a moment's notice. One or more students should be chosen from those who stand highest, who have other necessary requirements for assisting, and should be appointed to the staff, which not only adds materially to the strength of the department but is an inspiration to the student body as well. Frequent meetings of the staff should be held aside from the regular faculty meetings to report and discuss the progress of the work. Here the ideas of each member are brought out and each member is benefited by the

work handled by the others. The report from the clinical assistants, the instructing assistants, and laboratory assistants, and student assistants, encourage and inspire each other, and the department will be strengthened with each meeting.

COLLATERAL READING AND THESIS.

The habit of reading along collateral lines should be established in the last year so strongly that it will be retained after graduation. Too often the student attends a lecture on a subject regularly and depends upon experience gained in the clinic to carry him through all the demands of the course. It is a problem to carry on such work successfully for several reasons, one of which is the difficulty the student encounters to find time with his clinical demands and regular text-book reading and again it is difficult for the student to get only the good from some books and some dental journal articles on account of the lack of a definite statement of facts and conclusions which are so often lacking. This same trouble will be encountered at any period until mastered, and unless mastered while a student many will never become real students. Reading can be assigned and outlines can be made of articles by students and reported on in class to the benefit of the entire class. Often questions given out, the answers to which have to be found by outside reading, are a great help to the student and bring better results. It requires a great amount of help to make a student develop properly along these lines but one that justifies the effort. It is my custom to require a thesis on Mouth Hygiene before the holiday period, which forces the student to do a certain amount of reading before he has gone very far into his clinical work. This not only encourages reading but broadens the student's ability to observe while there is a goodly proportion of time left to guide him in his observations and records. The dental profession of the past has not been as eager in literary and research activity as it should have been and if we can develop a more studious profession we will have better journals and better books in the future to use in reference and collateral reading.

THE FOUR YEAR COURSE.

We are now in a new era of dental education; greater responsibility lies upon our shoulders now than ever before because of the better understood vital relation of oral health to the general health and efficiency of the individual. Also the responsibility of making the best use of the added year to the course is resting upon us. Every department is eager to acquire a portion of the added time

to extend its course to more comprehensive proportions. When the final adjustment is complete I trust there will be a larger amount of the student's time devoted to work that will raise our new profession to its proper level in the ranks of science, as well as to extend the *mechanical lines* of perfection. The requirements of a Doctor of Dental Surgery are now such that he must be trained to be more studious, more thoughtful, more observing as well as more skillful. Shall we not find more time for such work as will lead to a development of original work and progress along scientific lines?

SUMMARY.

In closing may I briefly summarize several points which I wish to emphasize? I recommend more of the visualization method of teaching materia medica and less committing to memory from reading only; prescription writing, it seems to me, might be adopted in the English language to a decided advantage to student and instructor. More time could well be spent in the study of pharmacology, not broadening in quantity but in intensity and a large proportion of it devoted to demonstration or laboratory exercises on animals that the student may more thoroughly appreciate the action of drugs. I wish to again call attention to the necessity of a sufficient staff of capable assistants so that work by the department may be advanced along various lines of clinical and research activities enabling each man to follow up his special cases with constant study which one man cannot do if crowded to the limit of his strength and energy by too many duties which would occupy his full time allowing no time for study and advance. I also recommend the establishing and carrying on of a definite line of investigation of new methods of treatment such as physical and electro therapeutics as well as original research work which is very much needed. Lastly and not least, but greatest in importance, constant study of the causes leading to pathologic disturbances which require treatment so that in the future less treatment will be needed because the cause has been removed before the damage has been done.

(Concluding remarks of Dr. Coolidge before the opening of the discussion.)

I will ask Dr. Black if he will kindly explain these charts, which he can do much better than I can for the reason that it is his idea that I have appropriated for my own use, which I believe is proper, for he has published this work and without doubt intends that it shall do the greatest good possible for it to do. I see

in it a very valuable, practical application to clinical work. This, of course, is only one phase of the subject, but to my mind the most important phase is that of investigating the conditions and having some practical method of recording those observations. The observations of a practitioner of dentistry, as he records them and makes deductions from them, are worth a great deal. The observations of a student in the infirmary are not as a rule worth very much, but if he is trained to observe properly by the time he graduates his observations are worth something. As was brought out in discussion yesterday, I believe the proper method of teaching is to train a student to be thoughtful, to be observing, and to be intelligent, and when such a man is turned loose I am not afraid of what he will do. Of course, there is a little difference in men as regards their aptitude in the mechanical part of prosthetic and operative dentistry; I will admit that this is along a little different line. But when it comes to the study of application in therapeutics, I believe the greatest good we can do is to train that student to be thoughtful and observing, giving him a good foundation in pharmacology, and then let him apply his knowledge to his observations.

DISCUSSION.

Dr. A. D. Black, Chicago

At the request of Dr. Coolidge, I am pleased to present a few slides and explain a plan for making mouth examinations, which I have used for a number of years.

We have all realized the need, as has been mentioned by Dr. Coolidge, of a simple plan by which we can make a record that will include not only all cavities in the teeth, but conditions of the soft tissues. This plan we are using is one which has been developed over a period of six or seven years until we have gotten to the place where we have felt safe to adopt it, not only in private practice, but also for the students in school.

There are three schemes of marking in this one simple plan:

(1) Figures are used to represent conditions of the investing tissues of the teeth;

(2) Letters are used to represent the condition of the pulp, and,

(3) Symbols are used to represent cavities of decay, crowns which may be upon the teeth, and operations to be performed.

Table of Numbers, Letters and Symbols Used In Recording Mouth Examinations.

CONDITIONS OF THE INVESTING TISSUES.

16. Open contact, no inflammation.
17. Recession of gingiva, cause not apparent.

INFLAMMATION, DUE TO

18. Salivary calculus deposits.
19. Serumal calculus deposits.

LACK OF CONTACT OF TEETH.

21. Separations following extractions.
22. Abnormalities of occlusion.
23. Uneven occlusal wear.
24. Weak contact.
25. Proximal decays.
26. Fillings or crowns.
27. Loss in width of neighboring space.
28. Detachment of trans-septal fibers.

IMPROPER CONTACT OF TEETH.

31. Abnormal forms of teeth.
32. Malpositions of teeth.
33. Interproximal wear.
34. Improperly finished fillings and crowns.

DEVIATIONS FROM NORMAL CONTOUR.

41. Sharp edges of cavities.
42. Imperfect margins of fillings.
43. Imperfect margins of crowns.

ABUSE IN DENTAL OPERATIONS.

51. Injuries with ligatures.
52. Injuries with finishing instruments and tapes.
53. Failures to remove ligatures and pieces of rubber.

LACK OF CLEANLINESS.

61. Lack of natural cleaning in mastication.
62. Lack of artificial cleaning.

ERRORS IN CLEANING OPERATIONS.

71. Misuse of toothpicks.
72. Misuse of rubber bands, silk floss.
73. Injuries with tooth-brush.

DETACHMENTS OF PERIDENTAL MEMBRANE.

1 to 15. Depths of pockets in millimeters, measured with special graduated explorers.

CONDITIONS OF PULP, ETC.

T Treatment required without reference to condition.
N Normal.
H Hyperemia.
E Exposed and alive.
D Dead.
R Previous root filling.
A Acute alveolar abscess.
C Chronic alveolar abscess.

RADIOGRAPHS.

x Small cross above each tooth roots and alveolus of which is to be shown in radiographs. Red ink preferred for this.

CARIES, ETC., OPERATIONS.

° Pit and fissure decay.
( ) Proximal decays, mesial and distal.

CONDITIONS OF INVESTING TISSUES —CONTINUED.

⌒ Gingival third decays, labial or buccal and lingual.

/ Missing tooth, previously extracted or unerupted.

X To be extracted.

O To be crowned.

= Dummy.

Partial denture. Line through each tooth, and these lines joined.

Full denture. Write same on diagram.

Atrophy, abrasion, erosion to be marked with red ink and name on bottom line to indicate condition.

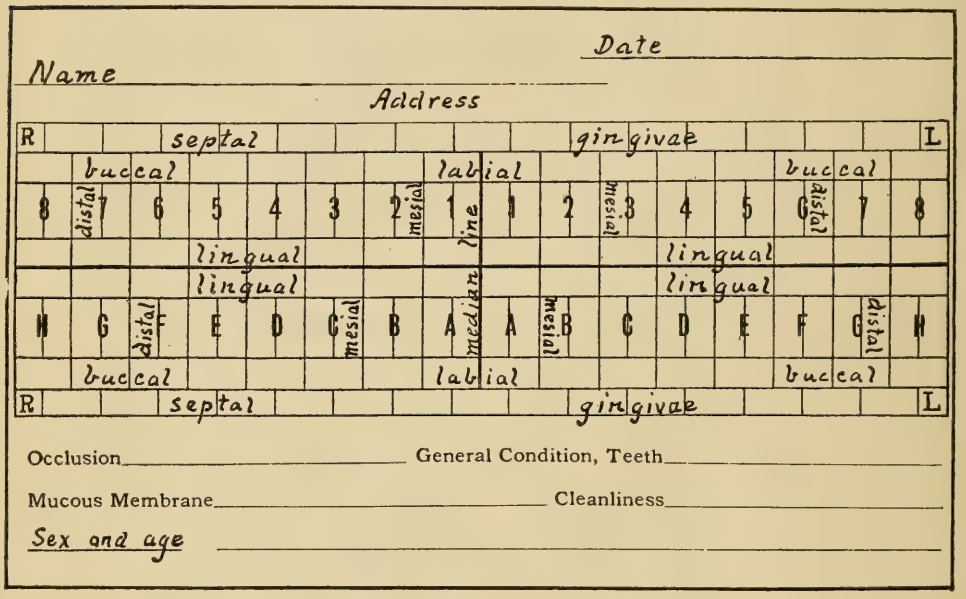

Fig. 1.

The Examination Card. Size 3 by 5 inches. The figures represent the upper teeth on either side of the mouth; 1, central incisor; 2, lateral incisor; 3, cuspid, etc. The letters represent the lower teeth on either side. The patient is supposed to be facing the operator and the right and left sides of the mouth are indicated by R and L in the corners of the diagram. The occlusal surfaces and incisal edges of the teeth are supposed to be directed toward the operator, therefore the buccal surfaces of the upper teeth would be up, and the buccal surfaces of the lower teeth would be down. It will be noticed that there is a rectangular space on either side and one above and one below each figure or letter; numbers may be placed in these spaces to indicate the condition of the investing tissues on the mesial, buccal, distal or lingual sides of each tooth.

There is another row of rectangular spaces at the top, and one at the bottom of the diagram; numbers may be placed in these to indicate the condition of the septal tissue and of the contact. See markings on other illustrations.

This plan of using figures and letters, instead of diagrams, to designate the teeth, enables one to transfer the record for a single tooth from daybook to record or ledger. For example, in Figure 2, a cavity is marked in the mesial surface of the upper right first molar; this can be written alone as 6) ¦, the perpendicular line indicating the median line of the mouth; therefore, tooth is on the right side. The mesial of the lower first molar on the left, in the same illustration, would be written alone ¦ (F.

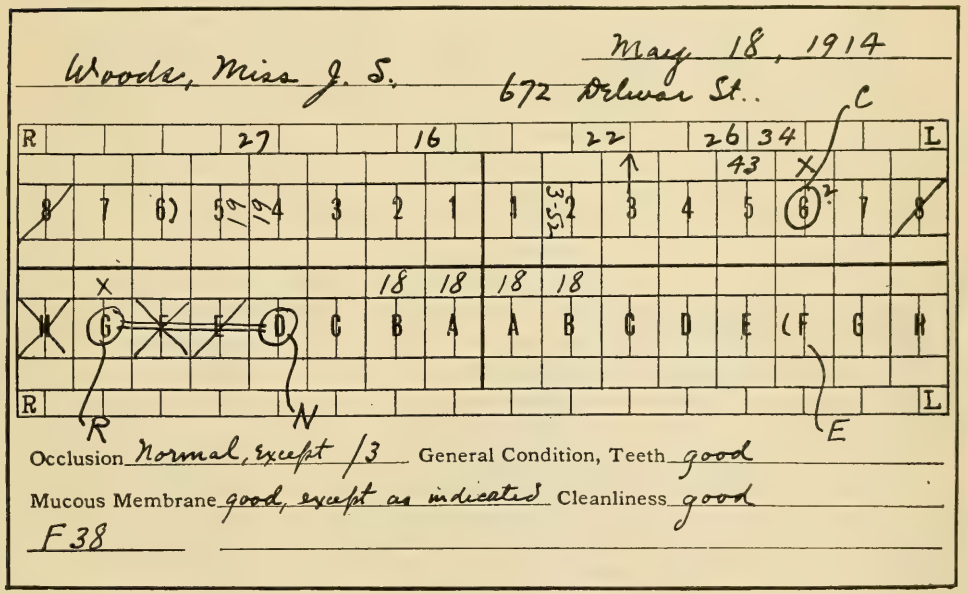

Fig. 2.

Record of Examination. In the upper arch, the figure 27 indicates an open contact between the right bicuspids, due to a flat proximal filling or cavity in a neighboring tooth. Apparently these teeth have separated on account of the cavity in the mesial surface of the first molar. Figure 16 indicates an open contact without inflammation between the upper right central and lateral incisors. Figure 52 records an injury in operating on the mesial surface of the left lateral, and there is a pocket 3 m. m. deep. The number 22 shows an open contact between the left lateral and cuspid due to an abnormality of occlusion. The number 26 shows a lack

of contact between the upper left bicuspids, the contact not having been restored in placing a filling or crown. There is an inflammation to the buccal of the first molar, due to the margin of a crown, as indicated by the figure 43. There is recorded an inflammation of the septal gingiva between the second bicuspid and first molar, due to a broad or rough contact of a filling or crown, as indicated by the figure 34. The upper left first molar is marked to be crowned, but there is a question mark, as the letter "C" indicates a chronic abscess, and the little x above the tooth is a memorandum that a radiograph is to be made. Both upper third molars are missing.

In the lower jaw, the pulp of the lower left first molar is marked exposed and alive (E). On the lower right side, the letter N indicates that the pulp is normal in the first bicuspid and the R that the root canals of the second molar have been filled by a previous operator. There is apparent no sign of an abscess; the radiograph has been ordered to learn the condition of the canals and of the bone about the apex. The second bicuspid is missing, the first molar and the third molar are to be extracted, and a bridge is to be placed from the second molar to the first bicuspid. There are deposits of salivary calculus to the lingual of the four lower incisors.

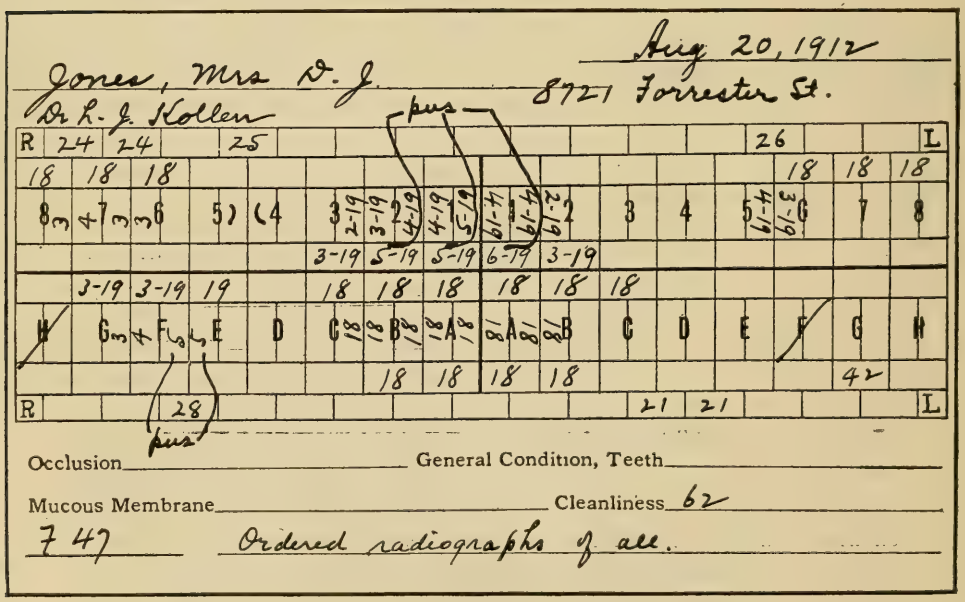

Fig. 3.

Record of Examination. Patient, woman of forty-seven years. Referred by Dr. L. J. Kollen, with request for report on mouth as

probable focus of infection. The record shows a mouth not well cared for by the patient (62), with deposits of salivary calculus (18) on the buccal of the upper molars, also on the lingual and proximal surfaces of the lower six front teeth, and on the labial surfaces of the four incisors.

In the upper arch, on the right side, the contacts between the molars are weak (24), permitting food to be forced through. There are pockets 3 and 4 m. m. deep on the proximal surfaces of these teeth. The septal gingiva between the bicuspids is inflamed because of the two proximal cavities (25). There are pockets of various depths—from 2 to 6 m. m. on the lingual and proximal surfaces of the incisors and right cuspid. Deposits of serumal calculus are indicated on all of these surfaces (19). Pus was discovered to the lingual of the right lateral and both centrals. There is inflammation between the upper left second bicuspid and first molar, due to a filling or crown which failed to make contact (26). There are pockets 4 and 3 m. m. deep, and deposits of serumal calculus (19).

In the lower jaw, in addition to the deposits of salivary calculus, there are pockets on the lingual surfaces of the first and second molars 3 m. m. deep, with deposits of serumal calculus (19). There is a deposit on the enamel of the lingual subgingival space of the second bicuspid (19), but no pocket. There are pockets on the proximal surfaces of the bicuspids and molars, 3, 4 and 5 m. m. deep, but no deposits. Pus was found in two of these. The contact between the second bicuspid and first molar is open as a result of the cutting off of the trans-septal fibers which normally pass from tooth to tooth (28).

On the lower left side the first molar is missing and the bicuspids have moved distally opening the contacts and permitting an inflammation of the septal tissues (21). A gingival third filling in the buccal surface of the second molar has a bad margin and the gingiva is inflamed (42).

Radiographs were ordered for the entire mouth.

By this plan we have a chart by means of which we can record an examination by a few simple marks which require no loss of time. In fact, it is the greatest time-saver I have in my practice, because when I have once made a thorough examination of a mouth I have it before me during the series of operations and also for the future, so that we know exactly the conditions with which we have to deal. I am glad to have this work detailed in Dr. Coolidge's

paper and to have his word as to the use which he has made of this plan, because we have found it so very satisfactory in our own practice and for the students in the school, impressing upon them as it does the advantage of having a record of their cases. How often it happens, both in school and in private practice, that it has been decided, we will say, to place a bridge; suppose it is to be from the lower first bicuspid to the second molar, and the first bicuspid is devitalized and the crown made for it as one abutment of the bridge, only to find afterward that the second molar is abscessed and must be extracted. Had the condition of this tooth been discovered beforehand, the treatment of the bicuspid would not have been undertaken and an awkward situation would have been avoided. Similar situations frequently develop from failure to study cases carefully. There is nothing more important than to teach our students to really make a full diagnosis of a case before they start to operate.

Dr. Coolidge's paper is a very excellent one, and reflects the type of service he is giving, both as an operator and teacher.

Dr. Hermann Prinz, Philadelphia

Dr. Coolidge has brought before us in a very comprehensive way the work he has included under the teaching of Materia Medica and Therapeutics. Each division of that work is so large that it would be impossible to enter into a full discussion thereof and do justice to the subject.

We are interested primarily in understanding what we are going to do with the subject of Materia Medica and Therapeutics in the four year course. When we look over the present curricula of the dental schools in the United States and see the place which the subject of Materia Medica and Therapeutics occupies, all those interested in the matter will acknowledge that this subject has in most instances, received, as expressed in the language of Broadway, "the bad end of the deal." First of all, when it is desired to have a subject of that kind taught, the important factor is to get a teacher properly trained and equipped to present it. But what is the usual course pursued as far as materia medica is concerned? Some dentist or medical practitioner is called up: "We need somebody to give us a course about dental materia medica beginning the first of the year; can you come up and lecture for an hour each week?" "Why, I am not competent to teach that subject," is the reply. "Don't you know anything about campho-phenique, Black's one-two-three, arsenic, etc?" And the prospective teacher replies, "Oh, yes." "Then that is sufficient." "Well, let me think the matter

over," and finally he says, "All right, but the main question is, what is in it?" And thus he comes to teach Materia Medica and Therapeutics. Here we have the rank and file of teachers in this subject.

When a dental college secures a teacher that knows the subject of Materia Medica and Therapeutics the students will not say that it is a dry subject. You can make it so interesting that when you come to talk to your class you will get their enthusiasm and they do not fall asleep. I try to teach the subject in a way to make it interesting to the class; I copiously illustrate the lectures by actual examples, referring the students to their infirmary work, and, on the other hand, demonstrating by tests made before their eyes when I say: "This drug has this particular action; now, I will show you that such and such a thing must occur in the test-tube or on the animal." In studying the subject of arsenic, for instance, I say: "I am going to inoculate this white rat's tail, you will see the hyperemia that follows; I tell you now that the rat will be paralyzed in the hind quarters and it is going to die from the effects of the arsenic within two or three days." They then *know* that arsenic will do just as I tell them, they *see* it.

I would not advise giving a mass of information about a conglomeration of drugs, no; if the student has a good understanding of a very few drugs it is far better. What I emphasize is that he should know the subject thoroughly as far as the action of the various classes of drugs are concerned as we use them in the dental infirmary. He wants to know, for instance, the nature of the action of the antiseptics, the relation of the metallic salts to the essential oils, etc. The reaction of each group is such and such; it will act so and so and produces such results. And if he knows that, the drugs themselves become of secondary importance, and as he may read up in the text-book it will be a comparatively easy matter.

We require two hours a week for lectures and demonstration and one hour for recitation. That has been our work up to the present, simply because in the three year course there was no room left for experimental work in the laboratory. In the four year course we will have a course in pharmacology as related to dental subjects only; there will be twenty exercises of about two and one-half hours, the class, in sections, going into the subjects as they present themselves in regard to the action of drugs as used by the dentist. I do not want a student to burden himself for instance, with the detail knowledge of ergot and its specific action on the uterus.

It is interesting, but of no consequence to him. What he wants to know is that if ergot has any effect at all, it is as a physiologic hemostatic, but it has no effect in stopping hemorrhage locally from a tooth. That is what he wants to know. When he has to deal with light dental hemorrhage and wants to apply a drug, he should use an astringent, which incidentally has a mild caustic effect. But if he has a pronounced hemorrhage, it is the mechanical packing of the wound which produces the most beneficial action.

Therefore, I believe that we should base our conception of the adequate teaching of this subject on class-room work, on quizzes in sections during special hours by the instructor, and supplementing this work by having the students in the laboratory, in sections, going over the experimental data of the most important drugs as we apply them in the infirmary. In this way the student will get a comprehensive knowledge of the drugs which he will use every day in clinical practice, and he will receive the largest amount of practical benefit.

As far as the teaching of pathology is concerned we should strongly emphasize the importance of it. In the last paragraph of Dr. Coolidge's paper he has pointed out to us the great value of the teaching of pathology which forms the basis of all clinical dental instruction. The weakest point in our teaching of dentistry in American institutions is the utter lack of presenting the principles of general pathology in a broad comprehensive way. The criticisms that are written on our American dental text-books abroad are always deploring the fact that, while such and such a text-book gives an excellent resumé of filling operations, crown and bridge-work, or other mechanical procedures, there is a lack of conception of the underlying principles of general pathology. I do not mean to say that the conditions of dental teaching in other countries are better. They lack in many points, but usually they have a good foundation in regard to the teachings of pathology. But unless we have a thorough grounding in pathology, our therapeutics are useless. We must know the factors that cause disease. Without it we cannot correctly diagnose the case and, as Dr. Coolidge and Dr. Black have both pointed out, this is essential, because only when we recognize the disease we can apply adequate therapeutic measures.

We have heard a great deal about prophylaxis; we teach it in our schools. We must clean the teeth thoroughly, we must use this prescription or that solution for washing the oral cavity and employ a toothpaste or a powder. What do we *know* of the question: *why* does a tooth decay? Such knowledge is the foundation of the

real prophylaxis. We all know *how* a tooth decays, that has been settled long ago. But the real question is: *Why* does it decay? If we don't know *why* it decays, how can we intelligently apply prophylactic treatment? That is the point that has been neglected in our investigation.

Dr. T. O. Heatwole, Baltimore

I am pleased to take advantage of an opportunity in which to give an expression of my views on the subject of "The Teaching of Materia Medica and Therapeutics." This branch of our curriculum has interested me deeply for the past ten years.

Your essayist has set forth most succinctly the essence of essentials in teaching when he states that "any subject to be taught successfully must be made both interesting and practical and should be a pleasure to those engaged." We may go one step farther and say, that this is in a peculiar sense true in the teaching of Materia Medica and Therapeutics. It may safely be assumed that no other branch in the course promises to be less interesting to the student and at the same time makes a greater demand on the teacher than the one under discussion.

Many schools in the past, by reason of their connection with medical colleges, have attempted instruction on this subject to medical and dental students jointly. Such a policy proved quite unsatisfactory as evidenced by the large numbers who failed on final examinations. Two reasons may be assigned for such results: First, the dental student reasoned that the course embraced much that was not intended for him, and, consequently, his interest slackened in the subject as a whole. Secondly, the student, through practical experience in the applications of remedies in the treatment of dental conditions, soon discovered that his medical instructor knew little or nothing concerning the therapeutic uses of drugs as they were applied in dental practice.

After some years of floundering in an effort to teach this difficult and unphilosophic subject I finally hit upon a scheme which has proven most satisfactory, giving results which justify a continuance of the practice and is as follows:

All drugs studied during the course are placed under group headings, for example, Stimulants, General Anesthetics, Local Anesthetics, Antiseptics, etc. The typical drug of the group, if there be such, is first given full consideration under at least four distinct headings; First, a description of the drug: second, the

preparations and doses: third, the physiologic action: fourth, the therapeutic uses; and in particular instances, the toxicology.

The student is made to realize the importance of studying the drug in this order by repeated warnings with later examinations containing questions formulated according to the outline. He soon sees the wisdom of dividing his subject for study purposes rather than attempt to get it *en masse* by reading generally a treatise on the drug. Once the typical agent of the group is disposed of others of the same class are studied in like manner, special attention being called to any deviation in physiologic action, toxicology, etc. A comparison is also made of preparations and doses. By thus repeatedly referring to the typical drug and the repeated comparison of it with others of its class the student learns to study and think along these lines and is able to get a better grasp of the entire group than he otherwise might be able to do.

In this connection it may be well to state each drug is placed under the group heading of its greatest popularity in dental practice. Here it is dealt with fully, though it may be known to possess qualities which would also give it a place under another group. In addition to the above outlined plan of presenting the subject, monthly written test examinations are given as the work progresses. If the student makes a general average in these tests during the year of at least 20 per cent in excess of the passing grade he is excused from final examinations at the end of the course.

I am well aware of the fact that there is a weak place in such a system, but the excellent results attained under the plan outweigh any possible objection which might be cited by reason of the piecemeal tests as against a general review of the entire subject when embraced in a final examination. The plan calls for regular application on the part of the student and monthly review work which serves to keep his interest at the highest possible pitch and also affords the instructor an opportunity to observe the progress being made. Of course, this entails an immense amount of work on the teacher who is called upon to grade monthly papers. This, however, may be done with comparative facility and with fairness and justice to all by first selecting and carefully grading the papers of a few of the men having the best standing and then by way of comparison mark the remainder.

The student should be encouraged to discuss with his teacher the cause for a low grade on any particular question. His supposed claim for undervaluation or even unfairness may best be

satisfied by allowing him to read his own statements on the subject and then read to him what has been said on the same point by one of the better men of the class.

A teacher is not necessarily a research man, and, vice versa, a research man may not always prove himself to be a teacher. Students are too often left to grope in the maize of a scientific presentation of a subject which tends to baffle and throw a curtain of despair over their further efforts. The practical teacher will not fail to simplify whenever possible any and every point which leaves room for such elucidation. Too often it is presumed that the subject presented is perfectly clear and understandable, when, if thoroughly studied and thought out one may discover a possible ambiguity of meaning. The teacher should never lose sight of the tyro's possible viewpoint. By keeping continually before him the difficulties encountered himself as a beginner the teacher who has a personal interest in the progress of his students will not allow them to flounder over intricacies which practice and experience have taught him to solve with greater ease.

I am not wholly in accord with the essayist on the advantages to be derived by a more extensive study of pharmacology. Most certainly no great amount of good can result from a superficial investigation along the lines suggested. And besides, not all students could be interested or would gain inspiration by delving into the whys and wherefores of drug action on special organs and tissues of the lower animals. It is quite probable that the special qualifications to be demanded of the dentist of the future will lead him into other fields than pharmacology. Were our profession an isolated one there might possibly be greater justification in believing it to be essential, but since allied scientific professions have given us access to the findings of special research along these lines, it may be regarded as the wiser policy on the part of the dental schools to refrain from attempting too much in this direction at this time.

Just how much should be attempted in the way of teaching general anesthetics by dental colleges is at the present time largely a matter of personal opinion. Some schools have assumed to give the student body as a whole practical experience in this branch along with the theoretical instruction, while others have contented themselves by giving only the theory and allowing the student individually to elect the practical work in accordance with his tastes and inclinations.

Unquestionably, the time is now ripe for some definite action in regard to what should be embraced in the teaching of this course on this subject. The signs of the times point to anesthesia as a specialty well suited to the dental profession. We know that the general surgeon of today insists that his anesthetist be an expert—one an whom he can rely to take care of his patient under any and all conditions. In order to meet this requirement a particular and even peculiar type of man is demanded. The percentage of men whose talents measure up to the standard of essentials on this point is apt to be small, consequently, it would seem to be the better policy to limit school instruction to general theory and regard the matter of further training of suitable men as a postgraduate proposition.

Dr. Coolidge,
(Closing the discussion)

With reference to the record chart which has been so thoroughly explained by Dr. Black, I would say that this outline, which is the application to oral pathology and therapeutics of the history sheet which the medical nan always has of his cases, is, so far as I know, the only method that has been devised for making a complete history and record of the conditions found in the patient's mouth, and which we should have for every case.

I appreciate very much the interest that has been taken and the words of those who have entered into the discussion which have contributed so much to the occasion.

Regarding Dr. Heatwole's remark as to the doubtfulness of the value of putting in more work in pharmacology, I am quite certain that after he has thought this over longer he will have a different opinion. It will be decidedly to the student's advantage to know more of the action of some of the drugs that we are using by having seen that action produced in an animal. As Dr. Prinz suggests in connection with arsenic, if the student sees the animal subjected to the effects of arsenic and observes the terrible results that follow, he will be less apt to be careless with the drug when using it in the mouth of his patient. I also believe if he sees the action of many other drugs upon the tissue and organs, for instance, formaldehyde, strychnin, the various anesthetics, etc., over and over again, he will surely have a more comprehensive understanding of them than if he relies entirely upon his text. At the time of my graduation I did not feel competent to administer anesthetics, although I had received an excellent course in materia medica and therapeutics and was supposed to be equipped for that procedure. It was only with the greatest apprehension

that I administered an anesthetic. I knew what I was to use in case of accident, but had very little conception of what those stimulants would do in case of an accident, and very little conception of what was going on in that patient that did not respond properly to the action of an anesthetic, although I had studied the subject as carefully as I knew how in my text. But when I saw experiments conducted on animals and observed the way the animals acted and reacted; when I saw those animals experimented on with strychnin and caffein and atropin and other drugs, producing definite results over and over again, then I knew far better what to expect if I introduced such drugs in my patients.

As stated in my paper, even though the student does not use all of these things in his own office, if he understands thoroughly the action of a few of the important drugs, it will place him in a position to handle his patient under all circumstances and conditions with a greater degree of confidence and success.

REPORT.

DR. E. H. LONG, BUFFALO, CHAIRMAN.

The Section on Materia Medica and Therapeutics had a delightful and profitable session this morning. Dr. E. D. Coolidge, University of Illinois, College of Dentistry, read a paper on the teaching of Materia Medica and Therapeutics, which was discussed by Drs. Arthur D. Black, Chicago; Herman Prinz, Philadelphia; T. O. Heatwole, Baltimore; Joseph Nolin, Montreal; A. L. LaRose, Montreal, and Dr. Coolidge in closing. The discussion was so general, taking in mouth examinations, records, pathological conditions, etc., that it would be impossible to give a comprehensive digest of it. However, we feel that it was all profitable.

The Section desires to present to the Institute something of a report of what they believe should be a working basis of the course in Materia Medica and Therapeutics under the four year arrangement of the curriculum. This report was, upon motion, adopted by the Section, and is presented herewith:

"The Section of Materia Medica and Therapeutics, desiring to report substantial progress regarding the four year curriculum, beg to report the following points of agreement and added recommendations:

1. That Materia Medica and Drug Therapeutics be given not less than 100 hours total;

2. That the subject begin in the second year with a lecture or recitation course of one hour per week;

3. That the subject continue in the third year, preferably with a definite recitation course, giving not less than one hour per week;

4. That the subject continue through the fourth year, giving both didactic and clinical instruction of not less than one hour per week.

It is also recommended:

(a) That Anesthesia be taught in the third and fourth years, giving of didactic and clinical instruction, not less than one hour per week, this course to include a practical amount of Physical Diagnosis as applied to heart and lungs.

(b) That this be supplemented by a short course in Urinalysis.

(c) That a demonstration course in Pharmacology form a part of the work in Materia Medica. This, in some schools, might be best given in connection with a laboratory course in Physiology.

(d) That the toxicology of dental remedies be given emphasis.

(e) That the regular instruction of the course be supplemented by:

A course in practical prescription writing;

A short course in general hygiene and the internal secretions, in the third year;

A short course in diseases of the tonsils, thyroid gland, larynx, lungs and heart, as bearing upon anesthesia, this to be given in the fourth year."

If in order, I move the acceptance of this report. (Motion seconded. Carried.)

THE COURSE IN DENTAL PATHOLOGY.

DR. ARTHUR D. BLACK, CHICAGO

(Read before Section VI, Dr. A. E. Webster, Chairman.)

In view of the fact that a good knowledge of pathology is necessary to the application of rational treatment, it is strange that so little attention has been given to the teaching of dental pathology. It seems to have been one of the anomalies of dental teaching that

pathological changes have been very commonly ignored in advocating treatment, either mechanical or medicinal.

About twenty-five years have passed since our knowledge of the pathology of dental caries was practically complete and yet it seems that there are some dental schools which today teach cavity preparation as a purely mechanical problem, without regard for well known progressive pathological changes in tooth structure, upon which the rules for cavity preparation should be based.

In considering the diseases of the investing tissues of the teeth, we find hundreds of articles in our literature advocating treatment of one kind or another, with some discussion of causes, but very little as to pathological changes. Treatment recommended has been largely empirical, or has followed more or less closely the methods employed for infections or wounds in other parts of the body, without recognition of the peculiarities of structure and function, and especially of the loss of these through disease.

In the treatment of the dental pulp, there seems to be little appreciation of the connection between the dental pulp and the remainder of the human mechanism. In many of our schools, students are instructed to seal in root canals medicaments which will destroy the periapical tissues if any escapes through the apical foramen, and the rules of asepsis are commonly ignored in clinical teaching if not in lectures. It seems that the profession has not yet realized the need of knowledge of pathology. There is the greater reason, therefore, for the most thorough courses in this branch.

From what can be learned from the announcements of a number of schools, there is wide variation in the teaching of dental pathology. In some this course is given by the chair of oral surgery, in some the courses in general and dental pathology are combined, in some the courses in pathology, materia medica and therapeutics, in others dental pathology and operative dentistry, in still others the course in dental pathology is distinct and separate from other courses. In each case the content of the course is doubtless varied accordingly. These differences are to a considerable extent matters of necessity, or of convenience, depending upon the inclination and ability of available teachers.

There is no question but that the entire subject of dental pathology must be divided among several chairs, and there should be variation in different schools according to conditions. The oral surgeon should naturally teach the pathology of those conditions

which require surgical interference. It would seem desirable that the chair of operative dentistry should present the pathology of dental caries, the pathology of the dental pulp and of the diseases of the investing tissues of the teeth may be very properly combined as a separate course in special dental pathology.

This is the plan followed at Northwestern. We have two professors of special dental pathology, one gives the course of the diseases of the investing tissues and their treatment; the other the diseases of the dental pulp and their treatment, including acute and chronic alveolar abscess. The closer consideration of the technical procedures in pulp treatment and the filling of root canals is left to the chair of operative dentistry. These two courses are arranged to fit into and support each other very nicely. The chair of operative dentistry presents the pathology of dental caries as a basis for proper cavity preparation. There is very carefully arranged co-operation between the teaching of the technical procedures of cavity preparation and filling and that of the pathology and treatment of the peridental membrane to impress, for example, the relationship between proper contacts and healthy gingivae. The chair of oral surgery takes up the conditions resulting from the death of the pulp (overlapping a little) where the chair of special pathology leaves them,—with the development of alveolar abscess, and presents the surgical treatment of these conditions and their sequellae.

On this plan, clinical teaching, as well as that by lectures, is conveniently divided; The chair of special pathology taking all cases in which the gingivae and peridental membrane are involved, the chair of operative dentistry all cases of pulp treatment and naturally those of caries, and oral surgery those pulp cases which have progressed to the stage of alveolar abscess or beyond.

What should be the students preparation for the course in special dental pathology? In answering this question we must think of every other course in the dental school curriculum and the bearing which it has or should have upon the course in dental pathology. This can not fail to impress the need of the most harmonious team work in the teaching of all these closely related subjects. There should be frequent conferences between the teachers, in order that there may be no cross firing. Lectures, laboratory instructors and clinical teachers should all be driving along closely parallel lines. All must be impressed with the necessity of omitting certain minor personal preferences to the end that there may be no detraction from well laid general rules of procedure.

Those subjects which should precede dental pathology are: dental anatomy, dental histology, dental physiology, dental physics, general bacteriology, general pathology, materia medica and therapeutics. The course in dental anatomy should include not only studies of the forms and structure of the teeth, but also of their investing tissues—gums, gingivae, peridental membranes, alveolar process and the maxillary bones with their muscular attachments. The course in dental histology should include studies of all these tissues except the muscles. This we consider to be among the most important of the courses in our curriculum, as it is basic to all clinical teaching. While dental histology may be well taught as such, it loses force unless it is made the foundation for a proper conception of function and loss of function as a result of pathological change. There should be the closest conceivable team work between the teachers of dental histology and dental pathology.

It is not suggested that there should be a separate course in dental physiology. This is mentioned to call attention to the need of emphasizing the physiological function of the different specialized elements in the dental tissues, which may probably be best done by the teacher of dental histology; and also the physiologic problems in mastication, which may be best presented by the chair of prosthetic dentistry and is important in the teaching of the pathology of the investing tissues and of dental caries.

We have concluded our laboratory course consisting of general problems in physics with a number of dental problems, some of which have a relation to pathological changes. Tests of the strength of the bite, the force required to chew foods, etc. are examples.

Both lectures and laboratory courses in bacteriology and general pathology, should if possible, precede the course in dental pathology, in order that the general problems involved in disease—the tissue changes which occur—may be known. The student should have some knowledge of the various forms of organisms, their action on the tissues, and the changes which result, in order that he may apply this knowledge to the dental tissues and be prepared to note, if not to anticipate, some of the changes which would be likely to occur under certain conditions of infection or irritation.

The course in materia medica should also precede the course in dental pathology, as a basis for the presentation of therapeutic treatment with the course in pathology. The majority of schools have separate chairs for materia medica and therapeutics. It seems

that in some this chair presents the studies of drugs and their therapeutic action, while others present by a single teacher the therapeutic treatment of the various dental diseases without sufficient regard for the pathology. It is the writer's opinion that the same chair should present both the pathology and treatment, in which case, the separate chair for materia medica and therapeutics should confine itself to the studies of drugs and their therapeutic action.

Dental pathology should be taught by lectures and recitations, in the laboratory and in the clinic, and it is the writers belief that the best results will be attained by presenting the treatment with the pathology. If the teaching of dental pathology is divided between the chairs of oral surgery, operative dentistry and special dental pathology, the chairs of operative dentistry and special dental pathology will be concerned particularly with the pathology of the teeth and their immediate investing tissues, so that a very practical laboratory course may be arranged to parallel the lecture presentation. This laboratory course should immediately follow the laboratory course in dental histology. In our four year course we plan to have general histology occupy the second semester of the first year and the first semester of the second year; dental histology the second semester of the second year and the laboratory course in dental pathology the first semester of the third year.

This laboratory course will consist of studies of microscopic sections of caries of enamel, showing the differences in beginning and penetration in pit and fissure and smooth surface decays, caries of dentin, spreading of decay along the dento-enamel junction, backward decay of enamel, atrophy or hypoplasia of the teeth, white enamel, white spots in enamel, mottled teeth, erosion and abrasion with the resulting secondary dentin, hyperemia and inflammation of the dental pulp, pulp nodules, hypercementosis, sections of investing tissues showing pathological changes, such as sections of inflamed gingivae, of tissue cut from pus pockets in cases of chronic suppurative pericementitis, showing the changes which have occured in the peridental membrane and alveolar process, sections showing tissue changes in chronic alveolar abscess and the so called root granulomas. While others might be added, these are sufficient for a splendid one semester course consisting of a three hour period per week. With many of these it will be found desirable to show slides of the normal structures side by side with the pathological.

The lecture and laboratory courses in general pathology are given during the junior year, thus preparing the student with the ground work for the senior courses in both oral surgery and special

dental pathology. In connection with the oral surgery clinics and the "peridental" clinic, the research department works up all of the material, thus supplementing in the senior year the laboratory courses of the junior year and carrying the studies in a more practical way to the various forms of neoplasms, cysts, glandular involvements, etc., rounding out the microscopical study of the whole field of dental pathology.

Our lecture courses are divided as follows: the chair of operative dentistry presents the dystrophies of the enamel-hypoplasia, white enamel, white spots, mottled enamel, also erosion, abrasion and caries, with treatment. The chair of special dental pathology presents the diseases of the peridental membrane and dental pulp, with treatment. The chair of oral surgery acute and chronic alveolar abscess, and all surgical diseases which occur within our field.

The clinical teaching should be connected in the closest possible way with the lecture and laboratory courses. This may be best done in different ways according to conditions in the various schools. The demonstrating force must be keep in close touch with the lectures; the lecturers should themselves devote as much time as possible to clinical teaching. Each of our lecturers devotes two half days a week to the clinic and on each occasion six students are regularly assigned for a "clinic-walk." They spend three houres observing the clinical demonstrations. We have one one-hour "peridental" clinic each week and one "operative" clinic each week, in which the heads of these departments operate and discuss cases before sections of thirty students.

The radiograph is one of our greatest aids in teaching dental pathology and we should make the most extensive possible use of this branch. We are now taking full sets of radiographs of the mouths of a considerable percentage of adults who seek service in our general clinics. This is coming to be a part of our routine mouth examination. We require a radiograph of every tooth presenting with a dead pulp, or a previously treated canal, before the student may undertake any operation whatsoever on the tooth. We require a radiograph of every root filling before points are awarded to the student for the treatment of the case. This program requires the full time service of two radiographers and an assistant, but we feel that it is doing a very splendid teaching service.

In closing I wish to present one phase of the teaching of dental pathology which is probably most generally neglected and yet is most important of all—a simple plan of making and recording a

full mouth examination; the thing necessary to a complete diagnosis. A detailed description would occupy more space than this paper will permit; the essential features may however be enumerated. A 3 x 5 inch white card or a similar amount of space of a sheet may be used for the record. There is a specially designed chart with spaces representing the four axial surfaces of each tooth, in which the condition of the soft tissue on each surface may be entered, also spaces in which to record the condition of the tissue of each interproximal space. A series of numbers is used to denote the approximate depth of pockets in millimeters, and other numbers to denote causes of inflammations, such as deposits of salivary or serumal calculus, open contacts, bad margins of fillings or crowns, etc. A short series of letters is used to record conditions of pulps, and a few symbols to indicate decays, teeth missing, teeth to be extracted, teeth having crowns or to be crowned, etc.

Each student is required to make out such an examination chart for each patient and have same verified by his demonstrator before undertaking operations for the patient. This, with the radiographic examination, and a short carefully prepared questionaire as to the patient's general physical condition, serve to give the student a very good understanding of the problems confronting him, and is thus better prepared to logically reason out a plan of treatment.

We have weekly meetings of our Junior faculty, consisting of recitation masters and demonstrators, where all of these questions are fully discussed and we have succeeded in developing an interest and team work among faculty members, assistants of all grades and students which enables us to round up all of the work of this course to bring about very satisfactory results in the clinic practice of our students.

DISCUSSION.

Dr. C. J. Grieves, Baltimore

I consider it a great privilege to be allowed to write this discussion on a paper so fine as that of Dr. Black's and only regret its late arrival rather hurries this to you without the full consideration which should be given such an important subject. Let us first agree, as I believe we all do agree, that an intimate "knowledge of the structural and functional changes produced by disease" which is known as pathology and a working conception of the causes of such disease which is known as etiology are the only reasons we have for being dentists or appearing before

the laity as scientific specialists: pari passu, our ability to cure and repair the ravages of disease is based on a minute knowledge of all the organs and tissues involved which finally in reaction is the whole human body in health and disease. A dentist having all knowledge and yet lacking pathology is very like the man described in Holy Writ who had all things but charity, in lacking charity, he lacked all. According to Dr. Black's idea every chair should teach its own pathology for of course it has its own lesions to treat and repair or it would not be worthy the name. We quote him as follows: "The chair of operative dentistry presents the dystrophies of enamel hypoplasia; white enamel, white spots, mottled enamel, also erosion, abrasion and caries with the treatment. The chair of special dental pathology presents the disease of the peridental membrane and dental pulp with treatment. The chair of oral surgery, acute and chronic abscess and all the surgical diseases which are in our field."

Again he says: "There is no question but that the entire subject of dental pathology must be divided among several chairs and there should be variation in different schools according to conditions." "The oral surgeon should naturally teach the pathology of those conditions which require surgical interference." Still again he says: "It is the writer's opinion that the same chair should present both pathology and treatment." Now my argument is and was in my former paper that this very method of teaching is the actual cause of the very limited knowledge of pathology from which the members of our profession are suffering today; it prompted the remark of Truman when he said of dentists: "Wanted! A sense of pathology," and it exactly reverses the methods of all hospitals and schools concerned in the study of disease.

The fault to my mind with this method is, it presupposes that every teacher in every chair in the dental school is a pathologist, which he is not; dental pathologists are rare and teachers of pathology are even more rare. There are few who can precede or follow the findings of their diagnosis and operation through the laboratory and write out an intelligent pathological report, more's the pity; this is the very reason we are all calling for more and better pathology. By the proposed method of teaching, the classes get a jumble of what the various teachers consider essential to their treatment, often lacking sequence sometimes science and as narrow as the specialists who teach it, whereas the course should be as broad and check up with all of the laws of general pathology. This is the reason why there are few dentists today who can write

a hospital report of the tissue changes resulting from periapical or gingival invasion without the house pathologist smiling, if you do not credit this statement talk to dentists who are frank about what they are doing in hospital service or survey our literature and note the dirth of pathologic illustrations. How far do you suppose we should have advanced in this study of diseases corrected surgically in this country, if in the last ten years surgeons had done the pathology without the help of the department of surgical pathologists? How long would the reports of the best surgeons stand fire in legal procedure? Pathology is pathology, there can be but one science and its specializations and only pathologists can teach it, he confirms the diagnosis of all the specialists in the healing art who depend upon and use his findings. If the professors of operative dentistry and oral surgery are to teach pathology why not insist on their teaching anatomy and histology or bacteriology, branches with which they are quite as much concerned. To my mind the only real pathology taught in Dr. Black's plan is that proceeding from the two lecturers and laboratories of special pathology he mentions.

There exists a second and even more practical objection to technical chairs such as operative dentistry, therapeutics and oral surgery teaching dental pathology and that lies in the fact brought out forcibly in my paper and never controverted that if the professor is teaching the "How," being the operative procedure and the "Why," being the etiology and pathology of the disease, upon which he is operating, the student mind will invariably grasp the "How" and lose the "Why," this is but natural, in learning the method of operating that which is tangible and is growing before his eye, he invariably misses the science unless it is made practical in the laboratory. Now on the contrary if the classic pathological picture gained from didactic and laboratory instruction, of periapical infection for instance, is in the student's mind, the oral surgeon may do an apicoectomy confirming his teaching to the technic of the operation stating in his diagnosis and prognosis the probable tissue damage which later the student again sees in slides in the pathological laboratory; this is the accepted practice in all medical institutions of which the writer is cognizant.

I am still of the opinion expressed in my paper of four years ago that pathology in the broadest sense of the word is the center from which all the other branches in the dental training should radiate, all ultimately looking to the cure of disease and to this end every teacher should follow his own line referring to the

pathology of the condition he treats and then allow the pathologist and bacteriologist to elaborate in the lecture room and laboratory on his findings. We heartily agree with the statement of the branches which should precede pathology laying the foundation for it together with the statement which should be accepted; i. e., that histology and pathology cannot be too closely related. The insistence on team work is also excellent as is the idea that general and special pathology should precede the dental pathology. The portion of the paper dealing with the making of notes and keeping of histories, oral as well as physical is most valuable; one of the gravest criticisms of the modern dentist is his lack of records other than the operations and the fees. Students cannot be taught too early to keep case histories.

I am glad Dr. Black agrees with me in urging pathology in the junior year with special and dental pathology in the senior year and I would insist again on the broadest possible training in general pathology and the special pathology of those diseases which induce oral lesions, as are in turn the product of dental diseases.

Dr. H. E. Friesell, Pittsburgh

It would be repeating an old story often told if we were to compliment the essayist upon the value of his paper. Dr. Black never gives us anything that is not of value, and I want to compliment him upon the thoroughness with which in the Northwestern University school they are carrying out these things. They are not just simply talking about them, but they are carrying them out in every detail of their teaching work from beginning to end. I have on many occasions had the opportunity of visiting the school with which Dr. Black is connected, and I always consider my visit there as a short postgraduate course. I never pass through that institution that I do not gain new ideas in regard to dental teaching, I never pass through it without being inspired to go home and strive to come somewhere near the same end in our own attainments.

Dental pathology certainly is an important subject in the dental curriculum. One feels like saying it is *the most important* subject, and yet we get in the habit when we examine into the various subjects in the dental curriculum of feeling for the time being that the particular subject which we are investigating is the most important one. So that it is rather difficult to say whether or not dental pathology is the most important. Certainly it is of vital importance.

We have much room for something that some of us don't like —standardization. And we are going to keep hammering on that subject until all of us realize what it means and until it has its influence in dental education. We are talking about the importance of dental pathology, and when we examine into the work of various schools of the country, as some of us have had opportunity to do, in inspecting those schools we have found at every turn a new argument for standardization of methods. Not simply molding those methods into a uniform class where there cannot be any variation, where there is no room left for the individuality of the teacher or the modification of the work, but the standardization of *principles.* And there is such wide variance in the dental schools of this country today. One gentleman says what we need in the four year course is the additional time devoted to hand training. Now, goodness knows, we are not perfect in the mechanics of dentistry, as some others seem to think we are. We have far to go in the development of manual dexterity and in mechanical technic, but we have a much farther road to travel with the brain than we have with the hand, with the science subjects; we must travel into the fields of science for the purpose of obtaining there knowledge that will ultimately, in the product of our institutions, develop a better dentist. From time to time statements are made regarding questions in dental pathology. One institution or one individual makes certain very forceful remarks in regard to the undesirability of using this, that, or the other thing, while some one else believes that the use of this, that, or the other thing is of great advantage in dental pathology and in the practice of dentistry. Neither side has any real foundation for the position assumed.

There are so many difficulties that we have had in the three year course and which we firmly believe will be taken care of in the four year course, that we are going to pass over discussion of that now until we have had a chance to try out the four year course and see if it does relieve some of these conditions as we hope it will.

In our own clinic we have for several years attempted to carry out the idea mentioned by Dr. Black this morning, in regard to specializing clinic work. We have not had sufficient rooms to enable us to have separate small clinics, but we have so far as possible divided the work among certain groups of our faculty men, and in that way we are getting more definite ideas as to the results obtained in those departments. I hope that when we get into our own new building we shall be able to have the separate rooms which Dr. Black speaks of, so that we may carry on a study of this particular line of treatment to a satisfactory termination.

I wish to commend very highly Dr. Black's suggestion in regard to the importance of keeping careful case histories. It is important at this time for the dental profession to collect a large number of case histories, so that, a little later on, when we have a statement to make in regard to any of these matters, it shall not be simply an opinion, but shall be a conclusion based upon a careful study of the records of these conditions as they are detailed in the case histories.

In closing I want to compliment Dr. Black and the members of his faculty for the way in which the institution they represent is solving the problems of the four year course, and also for the way in which the faculty is overcoming the difficulties incident to educating large numbers of dental students. If any of you have opportunity to go to Chicago and spend some time there—not just a brief visit, but some time—in studying the methods in use by the Northwestern University faculty, you certainly should do so. It will be to you a postgraduate course in dental teaching, as it has been to me. The co-ordination of the work, the way in which the faculty is divided so that each group of teachers can meet for conference in regard to their particular subjects—all these factors have resulted in the development of team work in that faculty which is simply wonderful.

Dr. Black,
(Closing the discussion)

Dr. Grieves' takes issue as to the manner in which pathology should be taught. I quite agree with him that pathology is pathology, and the day may come when we will be teaching more of pathology separate from the presentation of treatment than we do today. I have tried to present here as practical a paper as I could when applied to the conditions which are before us. Pathologists are scarce, and because they are so scarce we cannot all have men devoting their entire time to the teaching of dental pathology as we would like. I emphasized the fact that the student should have such a groundwork in the study of general pathology in both laboratory and lectures, previous to the consideration of these dental diseases, that when pathological changes in the dental tissues were presented he would know what to expect. Regardless of whether your basic work in pathology is taught by the man who presents the treatment or not, the man who presents the treatment must know it, or else his presentation of treatment is not going to be worth very much. The most important thing to my mind, whether the general pathology and the dental pathology are taught by one chair and the treatment by another, or one man teaches both dental pathology and treatment,

is that there shall be co-ordination in order that the teaching may be effective.

I want to say just one other word in connection with the teaching of pathology, and as applied to this whole situation of the relationship between the scientific studies so-called, and the application of treatment mechanically; and that is this: That the mind must not only conceive the thing which the hand is to do, but also know the relationship and effect of the mechanical thing to the tissues. Unless it does that, unless you have that concept which you can get only through these basic studies, what does the mechanical appliance amount to? If you have the most skilful technic that you can imagine, it is of little avail without the adequate mental concept of the thing to be accomplished. Only a few weeks ago I saw a nine tooth bridge, as beautiful a piece of mechanical work as one could imagine, with every one of the five roots supporting it abscessed, and the bridge had not been in place a month. There is the difference between the need of knowledge to guide the hand, and the expert hand without that knowledge to guide it.

REPORT.

DR. A. E. WEBSTER, CHAIRMAN.

We have nothing to report except that the meeting took place as scheduled in the program. Dr. A. D. Black, Northwestern University, Dental School, read a paper on the teaching of Dental Pathology and Bacteriology, which was discussed by Drs. Webster; C. J. Grieves, H. E. Friesell, Alfred Owre, J. D. Patterson, H. B. Tileston, Kurt H. Thoma, and Joseph Nolin, and J. O. McCall, Dr. Black closing the discussion. No final conclusions were arrived at with regard to the subject; we will let everybody come to his own conclusions upon the facts as they are given.

REPORT OF THE MASTER OF EXHIBITS.

Requests were made of each and every college in the Institute to send an exhibit of Student Technic to this meeting, and replies were received from practically all, many, I regret to say, in the negative.

Exhibits were forwarded by the following schools:

Philadelphia Dental College.
Northwestern University Dental School.

The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
College of Dentistry, University of Minnesota.
Georgetown University, Dental Department.
University of Pittsburgh, School of Dentistry.
Laval University, Dental Department.
University of Illinois, College of Dentistry.
St. Louis Dental College.
Southern Dental College.
Medical College of Virginia, Dental Department.
Western Dental College.
Colorado College of Dental Surgery.
University of Iowa, College of Dentistry.
Ohio State University, College of Dentistry.
University of Tennessee, College of Dentistry.
Creighton University, College of Dentistry.
New York College of Dentistry.
University of Buffalo, Dental Department.
North Pacific College of Dentistry.

Total number of schools sending exhibits, twenty. Classifying these exhibits, we have the following:

15 of Operative Technics.
14 of Plate Technic.
11 of Crown and Bridge Technic.
11 of Drawings (freehand and mechanical).
10 of Dental Anatomy Technic.
9 of Orthodontia Technic.
3 of Instrument Technic.
1 of Metallurgy Technic.
3 of Histology Technic.
2 of Radiographic and Photographic Technic.

Although this is a fair showing, it represents less than fifty (50 %) per cent of the total membership of the Institute. I wish to call attention to the fact that an exhibit need not be large or difficult to prepare, although, of course, the large exhibits are always very much appreciated. To those members who do not send or bring exhibits because it is "too much bother," I wish to state that any kind of student technic or teaching method, no matter how small, will be infinitely better than no representation at all, and, at the same time, tend to stimulate more interest in the exhibits. If there is insufficient time to prepare an elaborate exhibit, place a few pieces of interesting technic in your handbag, and bring it to

the meeting—you may be surprised at the interest shown in your exhibit.

I wish to thank those schools that have sent exhibits to this meeting for their kind cooperation.

Respectfully submitted,

CLYDE H. HEBBLE, Master of Exhibits.

REPORT OF DENTAL INDEX BUREAU.

The Chairman of your Special Committee on Indexing Dental Literature begs to submit the following report:

It is very generally conceded that a monthly index of dental literature will be of the utmost value to dental teachers, authors, and investigators; and, therefore, some means should be provided through this Body, or some other agency, to furnish such persons, at a minimum cost, a complete index of dependable dental literature at the earliest possible time after publication.

The Dental Index Bureau has not as yet submitted to its subscribers, or this Association, the results of its labors, other than in the form of annual reports.

The following proposal has been tentatively discussed with a number of men in the profession in the principal cities, and on the basis of distributing the labor, and thus creating a more general interest, has been concurred in. The details as to costs, personnel of the Committee, and some other features have not been completely worked out. The proposal follows:

A Committee on Indexing Dental Literature, consisting of twenty members, shall be appointed from within or without the membership of this Institute, or from both, by the President, with the approval of the Executive Board. This Committee shall select from its membership a Chairman and a Secretary-Treasurer.

Membership on the Committee shall cover a minimum period of at least five years, and shall be based upon the interest of the individual in indexing dental literature and his efficiency in carrying on this character of work.

This Committee shall compile an index of the original published articles, and such other printed matter appearing in such

dental journals as shall be decided upon by said Committee under both author and title headings, in suitable form (preferably card index) as included in a modification of the Dewey decimal system proposed and adopted by Dr. Arthur D. Black.

Each member of the Committee shall pledge himself to index the journal or journals assigned to him, after the manner outlined by the Committee; and such index shall be mailed to the Chairman of the Committee, within a specified time, say the 20th of each month, during which the journals are received.

Members of the Committee will be supplied with printed forms for their use in this work.

The Chairman of the Committee shall, with the aid of such assistants as may be necessary, edit and cause to be printed and distributed the material sent to him within a specified time, say, on or before the 20th day of the following month.

Certain general standards of abbreviations following the general plan laid down in the Index Medicus and approved by the Committee shall be adopted and used. No abstracts other than those sufficient to give the content under the title will be provided, though their value is greatly appreciated. If possible, such abstract shall be limited to ten (10) words.

Arrangements shall be made through subsidy, if possible, to provide an index of all articles of interest to the dental profession appearing in medical or allied scientific journals, through Dr. Fielding H. Garrison, Editor of the Index Medicus, Washington, D. C.

This Committee shall render an annual report to the Institute which shall be published in its transactions, and in the journal of the National Dental Association. The work shall be inaugurated within the year in which the Committee is formed and its finances assured, and it shall proceed first with the future work of the journals in hand and such other as may be approved by the Committee, and it shall then proceed within the limits of its ability and funds to index the preceeding numbers of the same journals.

The Committee should be empowered to make some arrangements with Dr. Arthur D. Black, and Dr. Wm. Bebb for the use and publication of the indices compiled by them to the mutual advantage of all parties concerned.

Since the Index will be used more extensively in libraries than elsewhere, it is proposed that the card index system be used (Guide

cards, 250 in each set, can probably be obtained from the Library of Congress at $5.00 per set).

Reprints or proofs of copy—about five entries to each sheet, as set up for card index—should be available for sale at a cost lower than the cost of cards, and yet fully 100% above the cost of providing the same for private subscribers who do not care to keep the card index system.

A minimum of 40 subscriptions of $100 each annually, or one hundred (100) subscriptions at $50 annually, payable in advance, should be secured for the purpose of carrying on this work, and this amount should be guaranteed until such time as other sources of revenue will justify some other plan of financing the problem. If the proposal is adopted, the funds now in the possession of the Dental Index Bureau shall revert to the use of the Committee.

The following journals are suggested as a beginning:

(1) *Journal of the National Dental Association.*
(2) *Journal of the Allied Dental Societies.*
(3) *Dental Cosmos.*
(4) *Dental Review.*
(5) *Dental Summary.*
(6) *Dental Register.*
(7) *Items of Interest.*
(8) *Pacific Dental Gazette.*
(9) *Dominion Dental Journal* (Canada).
(10) *Oral Health* (Canada).
(11) *British Dental Journal* (England).
(12) *Dental Record* (England).
(13) *Journal of the British Dental Society* (England).
(14) *Dental Digest.*
(15) *Western Dental Journal.*
(16) *Northwestern Dental Journal.*
(17) *Texas Dental Journal.*
(18) *Australian Dental Journal.*
(19) *Commonwealth Dental Journal* (Australia).
(20) *International Journal of Orthodontia.*

Respectfully submitted,

GUY S. MILLBERRY, Chairman.

FINANCIAL REPORT.

Balance in Bank, January 1, 1916	$ 357.68
Interest to January 1, 1917	10.28
	$ 367.96
Checks drawn on account of indexing	175.00
Balance in Bank, January 1, 1917	$ 192.96

JOHN OPPIE McCALL, Secretary-Treasurer.

CONSTITUTION AND BY-LAWS.

AMERICAN INSTITUTE OF DENTAL TEACHERS.

FORMERLY

INSTITUTE OF DENTAL PEDAGOGICS.

Organized at The World's Columbia Dental Congress, Chicago, 1893.

Revised Constitution and By-Laws.

ARTICLE I.

Name and Object.

Section 1. This association shall be known as the "American Institute of Dental Teachers."

Sec. 2. Its object shall be the improvement of the educational department of the colleges comprising its membership, by interchange of thought and formulation of methods.

ARTICLE II.

Officers and Standing Committee.

Section 1. The officers shall be a President, Vice-President and Secretary-Treasurer, the same to be selected from the active members and elected by a majority ballot at the annual meeting.

Sec. 2. There shall be one standing committee of three members, which shall be known as the Executive Board, the same to be elected by a majority ballot at the annual meeting.

Sec. 3. The Executive Board shall be elected and serve as follows: At each annual meeting there shall be one member elected to serve for three years.

ARTICLE III.

Meetings and Quorum.

Section 1. The regular meeting shall be held at such time and place as may be decided upon by the Executive Board.

Sec. 2. On the written application of the representatives of seven colleges the President may, on thirty days' notice, call special meetings to be held at such places as may be most convenient.

Sec. 3. Representatives from ten colleges shall constitute a quorum.

ARTICLE IV.

Members and Dues.

Section 1. Any college in the United States or Canada which complies fully with all the requirements of the National Association of Dental Faculties as regards educational standards, is eligible to apply for membership in this body.

Sec. 2. Active members shall consist of accredited representatives from the teaching staff of the colleges holding membership.

Sec. 3. Each college holding membership in this body may be represented by one or more of its teaching staff as its representatives, and such representatives shall be entitled to all the privileges of the Institute, **except that no college shall cast more than one vote on any matter acted on by the Institute.**

Sec. 4. Any teacher having been an accredited delegate to this body for three or more years from a school in good standing, may, in the event of withdrawing from the faculty, of such school, be made a permanent member —without vote—by a two-thirds affirmative vote of the members present.

Sec. 5. The annual dues shall be twenty dollars ($20.00) from each college, payable in advance. **The dues of a college must be paid before its representative can take part in the proceedings of the Institute.**

ARTICLE V.

Applications for Membership.

Section 1. Applications for membership shall be presented in writing at any annual meeting. This shall be referred to the Executive Board.

Sec. 2. A favorable report from the Executive Board followed by a favorable vote of two-thirds of the voting representatives present, is necessary to elect the applicant to membership.

ARTICLE VI.

Funds.

Section 1. All funds shall be applied to the necessary expense of the Institute and shall be paid out by the Secretary-Treasurer as ordered or as bills are approved by two members of the Executive Board.

ARTICLE VII.

Alterations and Amendments.

Section 1. Any amendment to the Constitution or By-Laws shall be proposed in writing at a regular meeting. It shall lie over until the next annual meeting and every active member shall be notified of such proposed amendment, when it may be adopted by an affirmative vote of two-thirds of the active members present.

ARTICLE VIII.

Section 1. Roberts' Rules of Order shall be the authority governing this body.

BY-LAWS.

ARTICLE I.

Duties of Officers.

Section 1. The duties of the President and Vice-President shall be such as usually pertain to these offices in similar organizations.

Sec. 2. The duties of the Secretary-Treasurer shall be such as pertain to the office of Secretary and Treasurer in similar organizations.

Sec. 3. The President and Secretary-Treasurer shall render an annual report.

ARTICLE II.

Duties of Executive Board.

Section 1. The Executive Board shall receive and act upon all applications for membership. It shall receive and act upon all bills presented to the Institute. It shall provide a program for each regular meeting, which shall be in the nature of papers, exhibits or reports from members upon the several topics pertaining to Dental Pedagogics.

Sec. 2. It shall attend to all business of the Institute and render an annual report of its transactions, which shall be published.

Sec. 3. It shall select the place for each meeting and provide the necessary arrangements.

ARTICLE III.

Loss of Membership.

Section 1. Any college that is in arrears for two years' dues shall be dropped from the roll.

Sec. 2. Any college dropped from the roll for the cause mentioned in Section 1 of this Article shall be required to pay all dues owing at the time it was dropped before it can be voted on for reinstatement.

ARTICLE IV.

Master of Exhibits.

Section 1. At each annual meeting the executive Board shall appoint a Master of Exhibits to serve until the close of the next annual meeting. He shall have full charge of the exhibits and shall make a report to the Institute.

Sec. 2. The Master of Exhibits shall have power to appoint such assistants as he may deem necessary.

APPENDIX A.

MEMBERS IN ATTENDANCE.

(Taken from Secretary's Register.)

Dr. Thos. L. Gilmer, Northwestern University, Dental School.
Dr. Arthur D. Black, Northwestern University, Dental School.
Dr. Fred W. Gethro, Northwestern University, Dental School.
Dr. Wm. Bebb, Northwestern University, Dental School.
Dr. Newton G. Thomas, Northwestern University, Dental School.
Dr. R. L. Stout, Northwestern University, Dental School.
Dr. Robert E. Blackwell, Northwestern University, Dental School.
Dr. Wm. G. Skillen, Northwestern University, Dental School.
Dr. Charles W. Freeman, Northwestern University, Dental School.
Dr. Ernest Kennedy, Northwestern University, Dental School.
Dr. M. M. Postle, Northwestern University, Dental School.
Dr. Alfred Owre, College of Dentistry, University of Minnesota.
Dr. Henry W. Morgan, Vanderbilt University, School of Dentistry.
Dr. J. H. Phillips, Vanderbilt University, School of Dentistry.
Dr. H. B. Tileston, Louisville College of Dentistry.

Dr. A. E. Webster, Royal College of Dental Surgeons.
Dr. W. E. Willmott, Royal College of Dental Surgeons.
Dr. A. J. McDonagh, Royal College of Dental Surgeons
Dr. R. D. Thornton, Royal College of Dental Surgeons.
Dr. Fulton Risdon, Royal College of Dental Surgeons.
Dr. John A. Bothwell, Royal College of Dental Surgeons.
Dr. C. A. Kennedy, Royal College of Dental Surgeons.
Dr. Irvin H. Ante, Royal College of Dental Surgeons.
Dr. B. O. Fife, Royal College of Dental Surgeons.
Dr. Geo. H. Coram, Royal College of Dental Surgeons.
Dr. Harold K. Box, Royal College of Dental Surgeons.
Dr. W. C. Smith, Royal Colege of Dental Surgeons.
Dr. W. M. McGuire, Royal College of Dental Surgeons.
Dr. Donald Clark, Royal College of Dental Surgeons.
Dr. J. P. MacLachlan, Royal College of Dental Surgeons.
Dr. Jas. W. Coram, Royal College of Dental Surgeons.
Dr. Edw. E. Belford, Western Reserve University, School of Dentistry
Dr. J. Herbert Hood, Western Reserve University, School of Dentistry.
Dr. F. C. Waite, Western Reserve University, School of Dentistry.
Dr. J. P. Henahan, Western Reserve University, School of Dentistry.
Dr. Truman W. Brophy, Chicago College of Dental Surgery.
Dr. Chas. E. Jones, Chicago College of Dental Surgery.
Dr. Marcus L. Ward, University of Michigan, College of Dental Surgery.
Dr. R. W. Bunting, University of Michigan, College of Dental Surgery.
Dr. Chalmer J. Lyons, University of Michigan, College of Dental Surgery.
Dr. Louis P. Hall, University of Michigan, College of Dental Surgery.
Dr. Henry T. Smith, Ohio College of Dental Surgery.
Dr. Guy S. Millberry, University of California, College of Dentistry.
Dr. F. T. Breene, University of Iowa, College of Dentistry.
Dr. R. H. Volland, University of Iowa, College of Dentistry.
Dr. Frederic R. Henshaw, Indiana Dental College.
Dr. Carl D. Lucas, Indiana Dental College.
Dr. J. D. Patterson, Kansas City Dental College.
Dr. Daniel H. Squire, University of Buffalo, College of Dentistry.
Dr. Eli H. Long, University of Buffalo, College of Dentistry.
Dr. Charles K. Buell, University of Buffalo, College of Dentistry.

Dr. A. Hoffman, University of Buffalo, College of Dentistry.
Dr. John Oppie McCall, University of Buffalo, College of Dentistry.
Dr. Ed. C. Kirk, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Herman Prinz, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Nathaniel Gildersleeve, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. M. H. Cryer, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Frederick W. Allen, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Chas. R. Turner, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Charles C. Voelker, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. E. T. Darby, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. W. A. Capon, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. A. Hopewell-Smith, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Robert J. Seymour, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. James R. Mallon, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Joseph L. Appleton, Jr., The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. W. T. Conard, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. John V. Mershon, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. John Burkhardt, Jr., The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. John S. Owens, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. R. S. Baldwin, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Henry L. Weber, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.

Dr. Wilson Zerfing, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Wm. H. Hough, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Sidney A. Sands, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Frank A. Fox, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Robert S. Davis, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. Charles W. Swing, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. R. Hamill D. Swing, The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Dr. W. G. Foster, Baltimore College of Dental Surgery.
Dr. B. Holly Smith, Baltimore College of Dental Surgery.
Dr. S. H. Guilford, Philadelphia Dental College.
Dr. I. N. Broomell, Philadelphia Dental College.
Dr. F. S. Rusca, Philadelphia Dental College.
Dr. C. Burton Addie, Philadelphia Dental College.
Dr. R. S. George, Philadelphia Dental College.
Dr. Leon A. Halpern, Philadelphia Dental College.
Dr. Boyd A. Loury, Philadelphia Dental College.
Dr. C. F. Wilbur, Philadelphia Dental College.
Dr. M. Hagopian, Philadelphia Dental College.
Dr. C. N. Russell, Philadelphia Dental College.
Dr. Alfred Haas, Philadelphia Dental College.
Dr. Jos. W. Bieser, Philadelphia Dental College.
Dr. J. P. Harper, St. Louis Dental College.
Dr. Harry A. Rathbun, St Louis Dental College.
Dr. H. M. Semans, Ohio State University, College of Dentistry.
Dr. C. H. Hebble, Ohio State University, College of Dentistry.
Dr. W. C. Graham, Ohio State University, College of Dentistry.
Dr. R. B. Wiltberger, Ohio State University, College of Dentistry.
Dr. H. S. Shumway, Ohio State University, College of Dentistry.
Dr. E. W. Martindale, Ohio State University, College of Dentistry.
Dr. Chas. W. Strosnider, Ohio State University, College of Dentistry.
Dr. J. H. Kennerly, Washington University, Dental Department.
Dr. H. E. Friesell, University of Pittsburgh, School of Dentistry.
Dr. J. F. Biddle, University of Pittsburgh, School of Dentistry.
Dr. H. F. Haslett, University of Pittsburgh, School of Dentistry.

Dr. J. C. Hipple, University of Pittsburgh, School of Dentistry.
Dr. L. O. Calehan, University of Pittsburgh, School of Dentistry.
Dr. Leslie Waddill, University of Pittsburgh, School of Dentistry.
Dr. Edw. C. Shryock, University of Pittsburgh, School of Dentistry.
Dr. Arthur B. French, University of Pittsburgh, School of Dentistry.
Dr. W. E. Coulson, University of Pittsburgh, School of Dentistry.
Dr. J. B. Litman, University of Pittsburgh, School of Dentistry.
Dr. L. W. Ohl, University of Pittsburgh, School of Dentistry.
Dr. H. C. Metz, University of Pittsburgh, School of Dentistry.
Dr. O. L. Hertig, University of Pittsburgh, School of Dentistry
Dr. Cecil O. Booth, University of Pittsburgh, School of Dentistry.
Dr. Robert Zugsmith, University of Pittsburgh, School of Dentistry.
Dr. O. M. Sorber, University of Pittsburgh, School of Dentistry.
Dr. H. D. Fonda, University of Pittsburgh, School of Dentistry.
Dr. A. C. Young, University of Pittsburgh, School of Dentistry.
Dr. W. A. Dunn, University of Pittsburgh, School of Dentistry.
Dr. C. T. Payne, University of Pittsburgh, School of Dentistry.
Dr. Alfred R. Starr, New York College of Dentistry.
Dr. Ellison Hillyer, New York College of Dentistry.
Dr. John Bethune Stein, New York College of Dentistry.
Dr. John L. Peters, New York College of Dentistry.
Dr. Fred L. Whiting, New York College of Dentistry.
Dr. Stephen F. Guntner, New York College of Dentistry.
Dr. Chas. R. Schram, New York College of Dentistry.
Dr. F. B. Moorehead, University of Illinois, College of Dentistry.
Dr. Edgar D. Coolidge, University of Illinois, College of Dentistry.
Dr. G. Walter Dittmar, University of Illinois, College of Dentistry.
Dr. Wm. H. Welker, University of Illinois, College of Dentistry.
Dr. Wallace Wood, Jr., Tulane University, College of Dentistry.
Dr. Herbert L. Wheeler, College of Dental and Oral Surgery, New York.
Dr. J. E. Nyce, College of Dental and Oral Surgery, New York.
Dr. Andrew J. Brown, Howard University, Dental Department.
Dr. A. W. Starbuck, Colorado College of Dental Surgery.
Dr. Frank A. Delabarre, Tufts College, Dental School.
Dr. Henry H. Piper, Tufts College, Dental School.
Dr. S. W. Bowles, Georgetown University, Dental Department.
Dr. George Ellis, Georgetown University, Dental Department.
Dr. Frank A. Casteel, Georgetown University, Dental Department.
Dr. Bruce L. Taylor, Georgetown University, Dental Department.
Dr. W. B. Hoofnagle, Georgetown University, Dental Department.
Dr. H. L. Kenahan, Georgetown University, Dental Department.

Dr. J. A. Taylor, Georgetown University, Dental Department.
Dr. Eudore Dubeau, Laval University, Dental Department.
Dr. Joseph Nolin, Laval University, Dental Department.
Dr. Louis DeGuise, Laval University, Dental Department.
Dr. J. B. Lagace, Laval University, Dental Department.
Dr. Thos. L. Larseneur, Laval University, Dental Department.
Dr. Alcide L. LaRose, Laval University, Dental Department.
Dr. G. A. H. Dufresne, Laval University, Dental Department.
Dr. J. A. Duhamel, Laval University, Dental Department.
Dr. Arthur Beauchamp, Laval University, Dental Department.
Dr. Hector Aubry, Laval University, Dental Department.
Dr. Ernest Charron, Laval University, Dental Department.
Dr. A. H. Hipple, Creighton University, College of Dentistry.
Dr. E. H. Bruening, Creighton University, College of Dentistry.
Dr. F. J. Despecher, Creighton University, College of Dentistry.
Dr. J. A. C. Hoggan, Medical College of Virginia, Dental Dept.
Dr. R. R. Byrnes, Medical College of Virginia, Dental Department.
Dr. Richard L. Simpson, Medical College of Virginia, Dental Dept.
Dr. D. M. Cattell, University of Tennessee, College of Dentistry.
Dr. A. W. Thornton, McGill University, Department of Dentistry.
Dr. F. A. Stevenson, McGill University, Department of Dentistry.
Dr. F. G. Henry, McGill University, Department of Dentistry.
Dr. A. Clifford Jack, McGill University, Department of Dentistry.
Dr. A. W. McClelland, McGill University, Department of Dentistry.
Dr. O. J. LeFebve, McGill University, Department of Dentistry.
Dr. T. O. Heatwole, University of Maryland, Dental Department.
Dr. Alex. H. Paterson, University of Maryland, Dental Department.
Dr. Ewell Neil, Meharry Dental College.
Dr. Eugene H. Smith, Harvard University, Dental School.
Dr. Kurt H. Thoma, Harvard University, Dental School.
Dr. Julius F. Hovestadt, Harvard University, Dental School.
Dr. R. J. Rinehart, Western Dental College.
Dr. Henry C. Thompson, George Washington University, Department of Dentistry.
Dr. Everett N. Hurd, North Pacific College of Dentistry.
Dr. S. W. Foster, Southern Dental College.
Dr. DeLos L. Hill, Southern Dental College.
Dr. M. H. Varn, Southern Dental College.
Dr. Russell Mitchell, Southern Dental College.
Dr. C. Victor Vignes, Loyola University, School of Dentistry.

APPENDIX B.

MEMBERSHIP COLLEGES WITH REPRESENTATIVES PRESENT.

Northwestern University, Dental School.
College of Dentistry, University of Minnesota.
Vanderbilt University, School of Dentistry.
Louisville College of Dentistry.
Royal College of Dental Surgeons.
Western Reserve University, School of Dentistry.
Chicago College of Dental Surgery.
University of Michigan, College of Dental Surgery.
Ohio College of Dental Surgery.
University of California, College of Dentistry.
University of Iowa, College of Dentistry.
Indiana Dental College.
Kansas City Dental College.
University of Buffalo, College of Dentistry.
The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania.
Baltimore College of Dental Surgery.
Philadelphia Dental College.
St. Louis Dental College.
Ohio State University, College of Dentistry.
Washington University, Dental Department.
University of Pittsburgh, School of Dentistry.
New York College of Dentistry.
University of Illinois, College of Dentistry.
Tulane University, College of Dentistry.
College of Dental and Oral Surgery, New York.
Howard University, Dental Department.
Colorado College of Dental Surgery.
Tufts College, Dental School.
Georgetown University, Dental Department.
Laval University, Dental Department.
Creighton University, College of Dentistry.
Medical College of Virginia, Dental Department.
University of Tennessee, College of Dentistry.
McGill University, Department of Dentistry.
University of Maryland, Dental Department.
Meharry Dental College.
Harvard University, Dental School.
Western Dental College.
George Washington University, Department of Dentistry.

North Pacific College of Dentistry.
Southern Dental College.
Loyola University, School of Dentistry.

APPENDIX C.

MEMBERSHIP COLLEGES NOT REPRESENTED.

Cincinnati College of Dental Surgery.
University of Southern California, College of Dentistry.
Dalhousie University, Faculty of Dentistry.
Marquette University, Dental School.

OFFICERS AND COMMITTEES OF ENSUING YEAR.

President.

Dr. John F. Biddle, 517 Arch Street, Pittsburgh, Pa.

Vice-President.

Dr. A. W. Thornton, McGill University, Montreal, Quebec.

Secretary-Treasurer.

Dr. Abram Hoffman, 529 Franklin Street, Buffalo, N. Y.

Executive Board.

Dr. R. W. Bunting, Ann Arbor, Mich.
Dr. A. D. Black, Chicago, Ill.
Dr. G. S. Millberry, San Francisco, Cal.

Local Committee of Arrangements.

Dr. Howard R. Raper, Indiana Dental College, Indianapolis, Ind.
Dr. Carl D. Lucas, Indianapolis, Ind.
Dr. Wm. E. Kennedy, Indianapolis, Ind.
Dr. D. Ernest Cofield, Indianapolis, Ind.

Master of Exhibits.

Dr. C. H. Hebble, 830 South High Street, Columbus, Ohio

Assistant.

Dr. I. Lester Furnas, 5503 E. Washington Street, Indianapolis, Ind.

Commission on Nomenclature.

Dr. F. B. Moorehead, 1470 Peoples Gas Bldg., Chicago, Ill.
Dr. M. L. Ward, Ann Arbor, Mich.
Dr. Wm. H. Welker, Chicago, Ill.

Commission on Text-Books.

Dr. Ellison Hillyer, 1143 Dean Street, Brooklyn, N. Y.
And Chairmen of Sections.

Chairmen of Sections.

Section I—Operative Dentistry, Dr. A. H. Hipple, Omaha, Neb.

Section II—Prosthetic Dentistry, Dr. H. L. Wheeler, New York City.

Section III—Oral Surgery and Radiography, Dr. C. J. Lyons, Ann Arbor, Mich.

Section IV—Dental Histology, Dr. C. J. Grieves, Baltimore, Md.

Section V—Materia Medica and Therapeutics, Dr. J. P. Buckley, Chicago, Ill.

Section VI—Dental Pathology and Bacteriology, Dr. J. D. Patterson, Kansas City, Mo.

LIST OF DENTAL COLLEGES

MEMBERS OF THE

AMERICAN INSTITUTE OF DENTAL TEACHERS.

The following list of Dental Colleges, together with their respective Deans, is given in the order in which the Colleges joined the Institute:

	Year of Admission	School	Dean	City
1.	1894	Northwestern University, Dental School	Dr. Thomas L. Gilmer	Chicago
2.	1894	College of Dentistry, University of Minnesota	Dr. Alfred Owre	Minneapolis
3.	1894	Vanderbilt University, School of Dentistry	Dr. Henry W. Morgan	Nashville
4.	1894	Louisville College of Dentistry	Dr. Wm. E. Grant	Louisville
5.	1894	Royal College of Dental Surgeons	Dr. A. E. Webster	Toronto
6.	1894	Western Reserve University, School of Dentistry	Dr. Edward E. Belford	Cleveland
7.	1894	Chicago College of Dental Surgery	Dr. Truman W. Brophy	Chicago
8.	1894	University of Michigan, College of Dental Surgery	Dr. M. L. Ward	Ann Arbor
9.	1894	Ohio College of Dental Surgery	Dr. H. T. Smith	Cincinnati
10.	1894	University of California, College of Dentistry	Dr. G. S. Millberry	San Francisco

	Year of Admission	School	Dean	City
11.	1895	University of Iowa, College of Dentistry	Dr. F. T. Breene	Iowa City
12.	1895	Indiana Dental College	Dr. F. R. Henshaw	Indianapolis
13.	1895	Kansas City Dental College	Dr. C. C. Allen	Kansas City
14.	1895	University of Buffalo, College of Dentistry	Dr. D. H. Squire	Buffalo
15.	1895	The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania	*Dr. E. C. Kirk	Philadelphia
16.	1896	Baltimore College of Dental Surgery	Dr. W. G. Foster	Baltimore
17.	1896	Philadelphia Dental College	Dr. S. H. Guilford	Philadelphia
18.	1896	Cincinnati College of Dental Surgery	Dr. G. S. Junkerman	Cincinnati
19.	1896	St. Louis Dental College	Dr. J. P. Harper	St. Louis
20.	1897	Ohio State University, College of Dentistry	Dr. H. M. Semans	Columbus
21.	1897	Washington University, Dental Department	Dr. J. H. Kennerly	St. Louis
22.	1898	University of Pittsburgh, School of Dentistry	Dr. H. E. Friesell	Pittsburgh
23.	1898	New York College of Dentistry	Dr. A. R. Starr	New York City
24.	1900	University of Illinois, College of Dentistry	Dr. F. B. Moorehead	Chicago
25.	1901	Tulane University, College of Dentistry	Dr. Wallace Wood, Jr.	New Orleans
26.	1903	College of Dental and Oral Surgery, New York	Dr. William Carr	New York City
27.	1903	University of Southern California, College of Dentistry	Dr. Lewis E. Ford	Los Angeles
28.	1903	Howard University, Dental Department	Dr. Edw. A. Balloch	Washington, D. C.
29.	1903	Colorado College of Dental Surgery	Dr. H. A. Fynn	Denver
30.	1903	Tufts College Dental School	Dr. Wm. Rice	Boston
31.	1905	Georgetown University, Dental Department	Dr. Shirley W. Bowles	Washington, D. C.
32.	1909	Laval University, Dental Department	Dr. Eudore Dubeau	Montreal
33.	1910	Creighton University, College of Dentistry	Dr. A. H. Hipple	Omaha
34.	1911	Medical College of Virginia, Dental Department	Dr. J. A. C. Hoggan	Richmond
35.	1911	University of Tennessee, College of Dentistry	Dr. J. A. Gardner	Memphis
36.	1911	McGill University, Department of Dentistry	Dr. A. W. Thornton	Montreal
37.	1911	University of Maryland, Dental Department	Dr. T. O. Heatwole	Baltimore
38.	1912	Meharry Dental College	Dr. G. W. Hubbard	Nashville
39.	1912	Dalhousie University, Faculty of Dentistry	Dr. Frank Woodbury	Halifax, N. S.
40.	1912	Harvard University Dental School	Dr. Eugene Smith	Boston
41.	1913	Western Dental College	Dr. S. E. Johnston	Kansas City
42.	1913	George Washington University, Department of Dentistry	Dr. J. Roland Walton	Washington, D. C.
43.	1913	North Pacific College of Dentistry	Dr. Herbert C. Miller	Portland
44.	1915	Marquette University, Dental School	Dr. H. L. Banzhaf	Milwaukee
45.	1915	Southern Dental College	Dr. S. W. Foster	Atlanta
46.	1915	Loyola University, School of Dentistry	Dr. C. V. Vignes	New Orleans

* Resigned.

Chart showing subjects taught and number of hours devoted to each subject.

The "Harmonizing of the Four Year Course in Dentistry". Fred W. Gethro, D.D.S., Page 75

FIRST YEAR

	Chemistry	Dental Anatomy	Prosthetic Technic	Physics	Technical Drawing	General Histology	Anatomy	English	Biology	Zoology	Physiology	Rhetoric	Operative Technic	Dental Technic	Hygiene	Mathematics	Electricity	Military Science	Comparative Anatomy	Embryology	Pathology	Morphology	Comparative Dental Anatomy	
*1	224	192	96			64	192	96	192							48								1104
2	320	80	176		192				192			96						c						1056
3	200	240	296				320																	1088
5	c	c	c			c	c				c												c	
8	c			c		c	c			c		c												
10	c	c	c	c	c		c		c						c									
11	320	256	128	192		120		96												64				1176
14	150	180	450		30	120	120		60		160												30	1320
20	c				c			c		c										c				1024
21	160			160	128			96	224															
22	256	128	224	192	96				192															1088
24	256	112	144			112				288		96												1008
26	180		400	30		120	120																	1000
31	160			192	48		160	96			64		80											896
32	c			c	c	c	c		c		c		c	c				c			c	c		
33			352	96	48		192	96	96				96											1200
40	240		80			220		128	240												80			1104
43	288	192	320			176		32	88															1096
44	288		224	64	48			96	192															1008
45	160	192	288			192	96				160													1088
Min.	150	80	80	30	30	64	96	32	60	288	64	96	80			48				64	80			896
Max.	320	256	450	192	192	220	320	128	240		160	96	96											1320
No. of Schools	19	11	15	10	10	11	11	9	11	3	5	3	3	1	1	1	1	1	1	1	2	1		

* The figures in the first column indicate the names of the schools. See Key, page 207.
Min. near bottom of page indicates the minimum number of hours given to the subject indicated at top of column.
Max. indicates the maximum hours given to the subject.

SECOND YEAR

	Chemistry	Anatomy	Physiology	Histology (General)	Prosthetic Dentistry	Operative Dentistry	Bacteriology	Pathology	Operative Technic	Materia Medica	Dental Anatomy Technic	Physics	Biology	Comparative Anatomy	Dental Histology	Dental Anatomy	Electricity	Morphology	Prophylaxis	
*1	224	192	160	64	192	192						192			64					1280
2	96	288	192	128	240	160										96				1200
3	32		192		344			96	224										16	1236
5	c	c	c		c	c	c			c										
8	c		c	c	c			c		c				c						
10	c	c	c	c	c	c	c	c	c										c	
11		208	160		336		144	112		64										1120
14	30	105	60	90	512	250		60		30										1317
20	c	c	c	c	c	c		c	c		c		c	c						
21	288	320	64						256	32	32									1376
22	128	224	128	128	224	224				32										1088
24	240	192		96	280		128		184											1120
26	180	90	180		150	130	90								90					1000
31	160	160	64	128			64	64	60											976
32	c	c	c	c				c			c	c					c	c		
33	192	128	128	128	352				224	64										1216
40	180	105	240		312		153		240											1130
43	80	192	96		320		128		224						32					1096
44	128	320	128	128		160														1088
45	160	128	160		228	192	144			64										1200
Min	30	90	60	96	150	130	64	60	60	32	32	192			32	96				976
Max	288	320	240	128	512	250	153	112	256	64					90					1376
No. of Schools	19	18	19	12	16	10	9	8	9	8	3	2	1	2	3	1	1	1	1	

* The figures in the first column indicate the names of the schools. See Key, page 207.
Min. near bottom of page indicates the minimum number of hours given to the subject indicated at top of column.
Max. indicates the maximum hours given to the subject.

Chart showing subjects taught and number of hours devoted to each subject

The "Harmonizing of the Four Year Course in Dentistry." Fred W. Gethro, D. D. S. Page 75

THIRD YEAR

	Operative Dentistry	Prosthetic Dentistry	Pathology	Orthodontia	Materia Medica	Bacteriology	Clinic Hours	Dental Pathology	Pharmocology	Radiography	Hygiene and Prophylaxis	Anesthesia	Prosthetic Technics	Surgery	Operative Technics	Physiology	Physical Diagnosis	Dental Metallurgy	Exodontia	Therapeutics	Dental Histology	Comparative Odontology	Comparative Dental Anatomy	Physics	Dental Economics	Metallurgy	Jurisprudence	Chemistry	Neurology	
*1	32	128	80	132	80	128	560	80		16		16		106		32	16						16							1302
2	32	192	112	96		112	672		48									16												1280
3	64			80		96	752	64		16		16	192							16										1328
5	c	c	c	c		c			c			c						c	c											
8	c	c	c		c						c				c			c						c	c					
10	c	c		c	c			c	c	c											c	c								
11	24	56		80			544	48	c	16	16	8		16	264		16				c	c								1184
14	30	60	60	45			945			30				30			30			60					15					1305
20	c	c	c	c	c	c		c		c	c					c			c											
21	32	64	160	96	32	128	640	32	32				128			32														1376
22	32	32	64	64	64	64	672	128		48	48	64		16						32										1280
24	32	32	124		64		256	64					168		168	224				196					196	10				1290
26	240	330	90	30	30	90				40	105	45																		1000
31	64	160	64	48	96	64	261						128																	981
32							Reports teaching "All Dental Subjects."																								
33	128	32	64	96	16	128	580	32	16	16		16	16	32	60		32										128			912
40	32	32			32		1056	32																					4	1210
43	64	32	96	32	64		896	32						64																1312
44	128		96	64		128	352						352																	1136
45	64	32	192	96	64		384			32	32	32		64			16		32						104					1144
Min	24	32	60	30	16	64	261	32	16	16	16	16	16	16	60	32	16	16	32	16			16		15	104	10	128	4		912
Max	240	330	192	132	96	128	1056	128	48	48	105	64	352	106	264	224	32			196						196					1376
No. of Schools	19	17	15	16	13	11	13	11	6	10	6	8	6	7	4	4	5	3	3	4	2	2	1	1	2	2	1	1		

* The figures in the first column indicate the names of the schools. See Key, page 207.
Min. near bottom of page indicates the minimum number of hours given to the subject indicated at top of column.
Max. indicates the maximum hours given to the subject.

Chart showing subjects taught and number of hours devoted to each subject

The "Harmonizing of the Four Year Course in Dentistry." Fred W. Gethro, D. D. S. Page 75

FOURTH YEAR

	Operative Dentistry	Prosthetic Dentistry	Orthodontia	Oral Surgery	Dental Pathology	Clinic Hours	Jurisprudence and Ethics	History	Dental Economics	Radiology	Oral Hygiene	Physical Diagnosis	Therapeutics	Anesthesia	Electro-Therapeutics	Accounting	Special Lectures	Dental Medicine	
*1	32	96	32	96	64	1024	16		16		16								1328
2	16	32	32	32	48	1152	32												1344
3	64	64		96		944	20			32				32					1284
5	c	c	c	c	c	c	c	c	c						c				
8	c	c	c	c	c			c											
10	c	c		c	c		c	c	c			c		c					
11	48	56	16	128	48	960	16									16	32		1320
14	30	60		75	60	1005							30	30				15	1305
20	c	c	c	c			c	c	c		c			c				c	
21	32	64	32	96		1072		32		16	32		32						1408
22	32	c	32	128		1034	16			48			32	64					1344
24	64	64	32	128		1024				16			64						1392
26	30	30	75	120	90	825		5			50	15	30						1000
31	64	224	48			848	32			16		32							1264
32	All Dental Subjects																		
33	32	32	32	32	32	1008	16		16										1280
40	32	16	32	32		1182				32									1429
43	64	32		64		1088	16			16	16	32					32		
44	32	32	32	96	32	960		32		48		32							1328
45	64	160	32	112	32	672	32										32		1136
Min	16	16	16	32	32	525	16	5	16	16	16	15	30	30		16	32	15	1000
Max	64	224	75	128	90	1182	32	32		48	50	32	64	64			32		1429
No. of Schools	19	19	15	18	11	16	12	7	5	8	5	5	5	5	1	1	3	2	

* The figures in the first column indicate the names of the schools. See Key, page 207.
Min. near bottom of page indicates the minimum number of hours given to the subject indicated at top of column.
Max. indicates the maximum hours given to the subject.

SUMMARY OF CHARTS "Harmonizing" by Fred W. Gethro

FIRST YEAR

SUBJECTS	Total Schedules	Schools teaching this subject in 1st year	Minimum Hours	Maximum Hours
Chemistry		19	150	320
Dental Anatomy		11	80	256
Prosthetic Technic		15	80	450
Physics		10	30	192
Technical Drawing		10	30	192
Anatomy		11	96	320
General Histology		11	64	220
English		9	32	128
Biology		11	60	240
Physiology		5	64	160
Rhetoric		3	96	96
Operative Technic		3	80	96
Zoology	20 Schedules	3	288	...
Dental Technics		1	...	...
Hygiene		1	...	...
Mathematics		1	48	...
Electricity		1	...	...
Military Science and Tactics		1	...	...
Comparative Anatomy		1	...	...
Embryology		1	64	...
Pathology		2	80	...
Morphology		1	...	...
Comparative Dental Anatomy		1	...	...
Total subjects for year 23.				

SECOND YEAR

SUBJECTS	Total Schedules	Schools teaching this subject in 2d year	Minimum Hours	Maximum Hours
Anatomy		18	90	320
Chemistry		19	30	288
Physiology		19	60	240
Histology		12	96	128
Prosthetic Dentistry		16	150	512
Operative Dentistry		10	130	250
Bacteriology		9	64	153
Pathology		8	60	112
Operative Technics		9	60	256
Metallurgy		...	90	96
Prosthetic Technics		6	224	256
Materia Medica		8	32	64
Dental Anatomy Technic	20 Schedules	3	32	...
Physics		2	192	...
Biology		1	...	...
Comparative Anatomy		2	...	...
Dental Histology		3	32	90
Dental Anatomy		1	96	...
Electricity		1	...	...
Morphology		1	...	...
Infirmary Prophylaxis		1	...	...
Total second year subjects 21.				

THIRD YEAR

SUBJECTS	Total Schedules	Schools teaching this subject in 3d year	Minimum Hours	Maximum Hours
Operative Dentistry		19	24	240
Prosthetic Dentistry		17	32	330
Pathology		15	60	192
Orthodontia		16	30	132
Materia Medica		13	16	96
Bacteriology		11	64	128
Clinic Hours		13	261	1056
Dental Pathology		11	32	128
Pharmocology		6	16	48
Radiography		10	16	48
Hygiene and Prophylaxis		6	16	105
Anesthesia		8	8	64
Prosthetic Technic		6	16	352
Surgery		7	16	106
Operative Technics		4	60	264
Physiology		4	32	224
Physical Diagnosis		5	16	32
Dental Metallurgy	20 Schedules	3	16	...
Exodontia		3	32	...
Therapeutics		4	16	196
Dental Histology		2	...	...
Comparative Odontology		2	...	...
Comparative Dental Anatomy		1	16	...
Physics		1	...	...
Dental Economics		2	...	...
Metallurgy		2	104	196
Jurisprudence		1	10	...
Chemistry		1	128	...
Neurology		1	4	...
Total subjects third year 29.				

FOURTH YEAR

SUBJECTS	Total Schedules	Schools teaching this subject in 4th year	Minimum Hours	Maximum Hours
Operative Dentistry		19	16	64
Prosthetic Dentistry		19	16	224
Orthodontia		15	16	75
Oral Surgery		18	32	128
Dental Pathology		11	32	90
Clinic Hours		16	525	1182
Jurisprudence and Ethics		12	16	32
History		7	5	32
Dental Economics		5	16	...
Radiology		8	16	48
Oral Hygiene		5	16	50
Physical Diagnosis		5	15	32
Therapeutics	20 Schedules	5	30	64
Anesthesia		5	30	64
Electro-Therapeutics		1	...	...
Accounting		1	...	...
Special Lectures		3	32	32
Dental Medicine		2	...	...
Total subjects fourth year 18.				

SUMMARY:

Total number subjects taught each year.

Freshman,	23	Junior	29
Sophomore	21	Senior	18

CHART FOR PAPER BY D. H. SQUIRE—Read before Section I

LECTURE-RECITATION, PLAN AND TECHNIC COURSE

BASIC SUBJECTS

PREVENTIVE DENTISTRY

ANATOMY

Osteology

Bones of the Head and Face.
Sinuses of the Cranium.

Myology

Muscles of Cranium and Face.
Muscles of the Neck.

Blood Supply

The Heart, Aorta, External and Internal Carotids and their Branches, The Vertebral Arteries, The Circle of Willis, and the Cerebral Arteries.
The Innominate Vein, the External and Internal—Anterior and Posterior Jugular Veins and Tributaries.
The Sinuses of the Interior of the Cranium.

Nerve Supply

The Brain, the Cerebro-spinal and Sympathetic Systems.
The twelve pairs of Cranial Nerves.

ORTHODONTIA

Normal Occlusion

Foundation of Operative Procedure

Malocclusion

Causes
Predisposing—Heredity—Habits.
Exciting—Premature and Delayed Extraction.
Lack of Contour in the Mesio-Distal Planes of Deciduous and Permanent Teeth.
Lack of Maintaining Space after the Loss of Deciduous Teeth.
Delayed Treatment after the Eruption of the Sixth Year Molar.

ORAL HYGIENE—Lecture Course

Cavity of Mouth Per Se

Anatomy—Review Structures of the Mouth.
Physiology—Mastication—Insalivation—Deglutition.
Speech and Appearance.
Bacteriology.
Pathogenic.
General—Tonsilitis—Pneumonia.
Tuberculosis, etc.
Local—Stomatitis—Pyorrhea Alveolaris
Alveolar Abscess, etc.
Non-Pathogenic.

Cavity of the Mouth Relative to Health

Normal—Proper Mastication and Insalivation of Food.
Abnormal—Incomplete Mastication, Pollution of Food, by Pus, by Debris, From Carious Teeth.
Treatment—General Hygiene—Orthodontia.
Home Care of the Mouth—Prophylaxis.
Use of Disclosing Stains—Removal of Deposits. Polishing Tooth Surfaces.

ORAL HYGIENE-TECHNIC

Testing the Normal Secretions of the Oral Cavity
Examination of Stains—of Hard and Soft Deposits.
Study of Incipieat Decay—of Erosion of Abrasion.
Note Effect of Loss of Tooth Structure on Soft Dental Tissue.
Make Plaster Cast of Patient's Mouth and reproduce the Stains—Deposits—Color of Gums and the beginning of Decay to be found upon the Teeth.
Outline the Treatment and Note the Improvement upon the Cast.

OPERATIVE DENTISTRY

The Dental Pulp

Review of Structure & Function, Methods Employed for its Protection—& its Devitilization, Treatment and Filling of Root Canals.

Instruments

Instrument Nomenclature—Cutting Instruments—Dental Engine—Pluggers—Electrical Appliances—Sterilization—Care and Use of Instruments.

The Dental Chair

Positions at and Adjustments of Chair.

Miscellaneous

Personal Appearance.
Adjustment of Rubber Dam—Cotton Rolls, Napkins, etc.
Methods of Separation—Immediate and Slow-Case Records.
Care of Bracket Table and Instrument Case.

Hypersensitive Dentine

Classification of Patients according to Johnson—Use of Medicaments for the Alleviation of Pain.

Management of Children

Review of Caries

Relative to its Inception and Progress.

Principles of Cavity Preparation

Of Deciduous and Permanent Teeth—For Porcelain—Malleted and Cast Gold Work.
The Steps in the Excavation of Caries, as, Outline Form, etc.
Detailed Description of Cavity Excavation in regard to Special Plans of Anchorage and the Value of the Anatomic Restoration of Tooth Forms and its Effect upon the Surrounding Tissues.

The History Manipulation, Physical Properties and Use of Gold—Amalgam—Porcelain—Zinc—Copper—& Silicate Cements and Gutta-Percha.
The Filling of Cavities with Gold by Classes—the Filling of Class 1 and 2 with Amalgam, the Adjustment of Matrices, Malleting and Carving—the Filling of Classes 1-2-5 with Cast Gold Direct and Indirect Methods—the Filling of Classes 3 and 5 with Porcelain Direct and Indirect Methods.
The Matrix, Shading Building and Baking—the Filling of Cavities with Cements and Gutta-Percha—the Finishing of Fillings—the Use of Stones, etc.—Interproximal Wear, Abrasion and Erosion.

Bleaching of Teeth—Dental Economica.

OPERATIVE TECHNIC

Review of Dental Pulp, Relations, Structure and Function—Capping and Devitilization—the Filling of Canals—the Application of Medicaments—Cementation of Dowels and Screws—the Method of Root Amputation, Instruments Employed, Shaping of Stump, etc.—Longitudinal and Transverse Sections are ground of the Upper Central Incisor. 1st Bicuspid, 1st and 2nd Molars—Lower Central, Cuspid, 1st and 2nd Molars—Making Silhouettes of Sections to Study the Relation of Pulp Canals to the Pulp Chamber.

CONTINUED ON PAGE 214

CHART FOR PAPER BY D. H. SQUIRE—Read before Section I

LECTURE-RECITATION, PLAN AND TECHNIC COURSE—Continued from Page 213

BASIC SUBJECTS

PREVENTIVE DENTISTRY

Operative Technic Continued

Instrument Making

Chisel, Hatchet, Hoe, Spoon, Enamel Hatchet, Gingival Marginal Trimmer and the Bayonet, Corkscrew and Parallelogram Types of Hand Pluggers. Sharpening of Instruments.

Cavity Nomenclature—Demonstrated upon Plaster Teeth, 5 Diameters) Cavity Preparation upon Typodont—Classes 1 to 5 according to Black Repeat Preparation, Classes 1 and 2 upon Natural Teeth for Malleted and Cast Gold Fillings—Principles of Hand Pressure and Mallet Force—Manipulation of Filling Materials as mentioned in Lecture Outline.

INFIRMARY CLINIC

Oral Hygiene

Application of Methods for Prevention of Decay and Gingival Irritation upon Students and Regular Clinic.

Pathology

Treatment of Diseases of the Dental Pulp, Peridental and Mucous Membranes, and Alveolar Process in their Relationship to Bodily Health.

Bacteriology

The Taking of Cultures from Foci about the Mouth and Growing the Organisms to determine the kind of Bacterial Infection.

Surgical Clinic

Pre and Post Operative Treatment in Extracting Cases, Root Amputations, Fractures of the Jaw, Pyorrhea Alveolaris, etc.

Orthodontia

The Correction of Mal-occlusion and the Methods of maintaining Normal Occlusion.

Dental Medicine—

The Application of Antiseptics, Detergents, Counter Irritants and Method of Hypodermic Injection, etc.

Radiography

Its Use in determining the Results of the Filling of Pulp Canals—The Extent of Fracture and Foci of Infection about the Jaw, etc.

Physical Diagnosis and Anesthesia

The Examination of Patients for the more Pronounced Affections of the Heart and Lungs which would make the Administration of the Nitrous Oxide and Oxygen to Patients for Momentary and Profound Anesthesia, harmless.

THE SCHEDULE

First Year

FIRST SEMESTER	SECOND SEMESTER
Anatomy-Descriptive	Anatomy-Descriptive
Dental Anatomy-Dental Anatomy Tech.	Dental Anatomy-Dental Anatomy Tech.
Histology	Histology
	Orthodontia

Second Year

FIRST SEMESTER	SECOND SEMESTER
Oral Hygiene—Oral Hygiene Tech.	Operative Dentistry Oper. Technic
Operative Dentistry Oper. Technic	Oral Surgery
Oral Surgery	Dental Histology
Dental Histology	

Third Year

FIRST SEMESTER	SECOND SEMESTER
Operative Dentistry	Operative Dentistry
Infirmary Practice	Infirmary Practice

Fourth Year

FIRST SEMESTER	SECOND SEMESTER
Operative Dent. Clinical Lectures	Operative Dent. Review of Theory
Infirmary Practice	Infirmary Practice

REPARATIVE DENTISTRY

DENTAL ANATOMY—Lecture

Descriptive Anatomy of the Teeth and Interproximal Space.

Technic

Molding in Plasticine—Enlarged 5 Diameters.

Drawing Tooth Forms and Sections—Carving Upper and Lower Jaws in Wax—Carving the Teeth in Ivory Natural Size.

Gaining Access to Pulp Chamber and Canals in Natural Teeth—Reaming Enlarging and Measuring Pulp Canals.

HISTOLOGY

In the Study of Enamel, Dentine, Pulp, Peridental Membrane and Gum Tissue—Emphasize—

Enamel Cleavage, Enamel Planing, Beveling Cavosurface Angle.

Inclination of Cavity Walls—Anchorage by Steps By Grooves, by Converging Walls.

Dental Pulp

Its Protection in Excavation and Filling of Cavities—Recessional Lines of Pulp—Tissue Changes due to Age and Environment.

Peridental Membrane and Gum Tissue

Structure—Function—Results of Injury During the Filling Process.

Treatment of the Tissues after Operating.

ORAL SURGERY

Principle Involved in the Repair of the Hard and Soft Tissues of the Mouth—Fractures of the Maxillae—Extraction.

Pyorrhea Alveolaris—Cleft Palate—Hare Lip Amputation of Roots—Resection of Bone—Tumors.

SPECIAL SUBJECTS { PATHOLOGY, BACTERIOLOGY, DENTAL MEDICINE, RADIOGRAPHY, PRACTICE OF SURGERY } **DEMONSTRATED IN THE INFIRMARY CLINIC**

CHART OF TEACHERS—AMERICAN INSTITUTE OF DENTAL TEACHERS

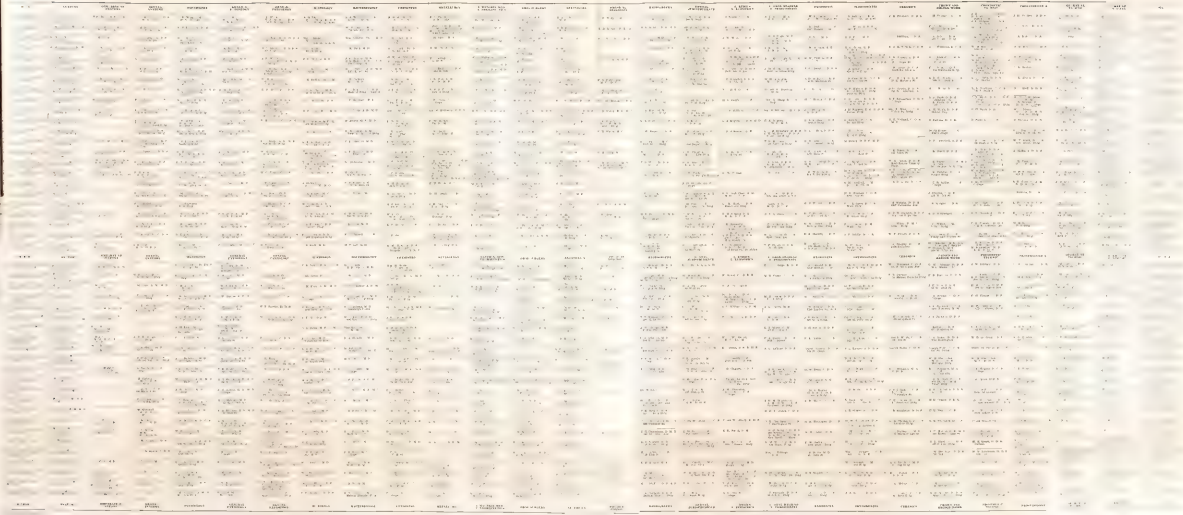

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CHART OF TEACHERS—American Institute o

COLLEGE	ANATOMY	COMPARATIVE ANATOMY	DENTAL ANATOMY	PHYSIOLOGY	GENERAL PATHOLOGY	DENTAL PATHOLOGY	HISTOLOGY	BACTERIOLOGY	CHEMISTRY	METALLURGY	MATERIA MED. & THERAPEUTICS	ORAL SURGERY	ANESTHESIA	PERIO. & ORTHODONTIA	RADIOLOGY	DENTAL JURISPRU.
COLLEGE	ANATOMY	COMPARATIVE ANATOMY	DENTAL ANATOMY	PHYSIOLOGY	GENERAL PATHOLOGY	DENTAL PATHOLOGY	HISTOLOGY	BACTERIOLOGY	CHEMISTRY	METALLURGY	MATERIA MED. & THERAPEUTICS	ORAL SURGERY	ANESTHESIA	PERIO. & ORTHODONTIA	RADIOLOGY	DENTAL JURISPRU.

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College of Dentistry
University of Minnesota

PROCEEDINGS

—OF THE—

Twenty-Fifth Annual Meeting

—OF THE—

AMERICAN INSTITUTE OF DENTAL TEACHERS

—HELD AT—

PITTSBURGH, PENNSYLVANIA

January Twenty-Ninth, Thirtieth and Thirty-First,
Nineteen Hundred and Eighteen

PUBLISHED BY
AMERICAN INSTITUTE OF DENTAL TEACHERS
ATLANTA, GEORGIA.
NEXT MEETING, PLACE TO BE ANNOUNCED,
JANUARY 28, 29 AND 30, 1919

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ABRAM HOFFMAN, Secretary-Treasurer,
381 Linwood Avenue, Buffalo, N. Y.

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LIST OF OFFICERS OF THE AMERICAN INSTITUTE OF DENTAL TEACHERS

FORMERLY INSTITUTE OF DENTAL PEDAGOGICS

From Date of Organization — Organized at Chicago, August 18th, 1893

TEMPORARY CHAIRMAN—H. A. Smith, Cincinnati — TEMPORARY SECRETARY—J. A. Dale

Annual Meeting	Year	Place	President	Vice-President	Secretary-Treasurer
1	1893	Chicago, Ill.	D. M. Cattell, Chicago		J. A. Dale
2	1894	Old Point Comfort, Va.	D. M. Cattell, Chicago	T. E. Weeks, Minneapolis	J. F. Stephan, Cleveland
3	1895	Asbury Park, N. J.	T. E. Weeks, Minneapolis	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
4	1896	Saratoga, N. Y.	H. W. Morgan, Nashville	S. H. Guilford, Philadelphia	J. F. Stephan, Cleveland
5	1897	Chicago, Ill.	G. V. Black Chicago	N. S. Hoff, Ann Arbor	D. M. Cattell, Chicago
6	1898	Cincinnati, O.	N. S. Hoff, Ann Arbor	H. P. Carlton, California	H. J. Goslee, Chicago
7	1899	Philadelphia, Pa.	H. P. Carlton, California	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago
8	1900	Nashville, Tenn.	G. E. Hunt, Indianapolis	H. J. Goslee, Chicago	H. B. Tileston, Louisville
9	1901	Pittsburgh, Paa.	H. J. Goslee, Chicago	J. D. Patterson, Kansas City	H. B. Tileston, Louisville
10	1902	Chicago, Ill.	J. D. Patterson, Kansas City	H. B. Tileston, Louisville	W. E. Willmott, Toronto
11	1903	Buffalo, N. Y.	H. B. Tileston, Louisville	H. W. Whitslar, Cleveland	W. E. Willmott, Toronto
12	1904	Louisville, Ky.	S. H. Guilford, Philadelphia	D. R. Stubbleleld, Nashville	W. E. Willmott, Toronto
13	1905	New York City	D. R. Stubblefield, Nashville	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto
14	1906	Chicago, Ill.	J. H. Kennerly, St. Louis	W. E. Willmott, Toronto	B. E. Lischer, St. Louis
15	1907	New Orleans, La.	W. E. Willmott, Toronto	Ellison Hillyer, Brooklyn	B. E. Lischer, St. Louis
16	1908	St. Louis, Mo.	Ellison Hillyer, Brooklyn	John Q. Byram, Indianapolis	B. E. Lischer, St. Louis
17	1909	Toronto, Canada	John Q. Byram, Indianapolis	D. M. Gallie, Chicago	Fred W. Gethro, Chicago
18	1910	Washington, D. C.	D. M. Gallie, Chicago	H. E. Friesell, Pittsburgh	Fred W. Gethro, Chicago
19	1912	Chicago, Ill.	H. E. Friesell, Pittsburgh	D. H. Squire, Buffalo	Fred W. Gethro, Chicago
20	1913	Pittsburgh, Pa.	D. H. Squire, Buffalo	Fred W. Gethro, Chicago	John F. Biddle, Pittsburgh
21	1914	Buffalo, N. Y.	Fred W. Gethro, Chicago	H. M. Semans, Columbus	John F. Biddle, Pittsburgh
22	1915	Ann Arbor, Mich.	H. M. Semans, Columbus	S. W. Bowles, Washington, D. C.	John F. Biddle, Pittsburgh
23	1916	Minneapolis, Minn.	S. W. Bowles, Washington, D. C.	John F. Biddle, Pittsburgh	Abram Hoffman, Buffalo
24	1917	Philadelphia, Pa.	John F. Biddle, Pittsburgh	A. W. Thornton, Montreal	Abram Hoffman, Buffalo
25	1918	Pittsburgh, Pa.	A. W. Thornton, Montreal	R. W. Bunting, Ann Arbor	Abram Hoffman, Buffalo

TWENTY-FIFTH ANNUAL MEETING

---OF THE---

AMERICAN INSTITUTE OF DENTAL TEACHERS

MINUTES

THE twenty-fifth annual meeting of the American Institute of Dental Teachers convened at the Hotel Schenley, Pittsburgh, Tuesday morning, January 29th, 1918.

The meeting was called to order by President John F. Biddle at 10:15 o'clock.

Dr. Samuel Black McCormick, Chancellor of the University of Pittsburgh, gave the invocation, following which an address of welcome was given by Hon. Edward V. Babcock, Mayor of the city of Pittsburgh, (see page 10), response being made by Dr. D. M. Cattell, Memphis, (see page 12).

With Dr. Cattell presiding the President then read his address, (see page 14) which was discussed by Drs. Ellison Hillyer, J. H. Kennerly, A. D. Black, F. B. Moorehead, Alfred Owre, H. L. Wheeler, Henry W. Gillett, and Otto U. King, (Secretary-Editor Nat'l Dental Association), Dr. Biddle closing the discussion. The President resumed the chair.

It was moved by Dr. H. M. Semans that an appropriate committee be appointed, at the discretion of the President, to present, before the close of this meeting, a report on the recommendations contained in the President's address, and to make a further report at the next meeting. Motion seconded by Dr. Hillyer, and carried.

The Secretary-Treasurer presented his report, (see page 65), which was accepted, the Treasurer's report being referred to the Executive Board for auditing. Also the application of Columbia University, School of Dentistry, New York, for membership in the Institute, was referred to the Executive Board for action.

TUESDAY AFTERNOON

The meeting was called to order by the President at 2:15 o'clock.

The Secretary read the minutes of the morning session, which were approved.

Dr. Nelville S. Hoff, Ann Arbor, Mich., read a paper on "The Value of the Dental Library and Museum to Dental Teaching," (see page 29). Discussed by Drs. A. D. Black, H. E. Friesell, E. H. Mauk, Alfred Owre and J. H. Kennerly, Dr. Hoff closing the discussion.

Dr. H. E. Friesell, Pittsburgh, read the first paper of the War Symposium, on "The War Duties and Opportunities of Dental Schools," (see page 46). Discussed by Drs. Eugene Smith, F. T. Breene, A. E. Webster, Major H. D. Arnold, Major W. H. G. Logan, Dr. N. S. Hoff and Dr. F. R. Henshaw, Dr. Friesell closing the discussion.

TUESDAY EVENING

The meeting was called to order by the President at 8:00 o'clock.

The Secretary read the minutes of the afternoon session, which were approved.

At the direction of the Executive Board, Dr. A. D. Black presented the following resolution:

RESOLUTION.

"In compliance with the request of the Surgeon-General of the Army that this body should furnish information as a

basis for classification of the dental schools of the United States;

"Be it Resolved, That the American Institute of Dental Teachers, composed of the faculties of practically all of the dental schools of the United States, recommend to the Surgeon-General of the Army that the report to be submitted by the Educational Council of America be accepted for this purpose."

It was moved by Dr. Black that the foregoing resolution be adopted. Motion seconded. The resolution was adopted by unanimous vote.

Dr. A. E. Webster, Toronto, read a paper on "How to Teach Asepsis in a Dental College, (see page 65). Paper discussed by Dr. H. B. Tileston.

The remaining two of the three papers comprising the "War Symposium" were then read, as follows:

"Modifications in the Teaching of Oral Surgery as a War-Time Measure," Dr. Chalmers J. Lyons, Ann Arbor, Mich., (see page 70). Paper discussed by Drs. F. B. Moorehead, Hugh W. MacMillan, S. L. McCurdy and T. W. Brophy, Dr. Lyons closing the discussion.

"War Prosthesis," Dr. Joseph Nolin, Montreal, (see page 79). Paper discussed by Drs. E. H. Mauk, S. H. Guilford, H. W. Morgan and A. W. Thornton.

The meeting adjourned, to convene in sectional meetings, (see pages 134-150), Wednesday 9:00 a. m.

WEDNESDAY MORNING

The meeting was called to order by the President at 11 o'clock.

The Secretary read the minutes of the preceding session, which were approved.

In the absence of the senior member of the Executive Board, Dr. Black reported that the books of the Treasurer had been audited and found correct.

Dr. Black then presented a "Proposed Plan for Publishing an Index of Dental Literature," (see page 88), at the close of which the following motion was made and unanimously carried:

"The general plan for publishing an Index of Dental Literature, as presented by Dr. Black, has the approval of this body, and the Executive Board is hereby directed to work out the details of the plan and to then present the problem to each individual school in the form of a definite agreement which the various schools may sign, this to be the basis for carrying on the work to completion."

Dr. E. D. Coolidge, Chicago, read a paper on "The Teaching of the Technic of Cleaning, Curetting, and Filling of Root Canals," (see page 91), illustrated by radiographic lantern slides. Discussed by Drs. D. M. Cattell, H. M. Semans, F. W. Gethro and A. E. Webster, D. H. Squire, the essayist, closing the discussion.

The meeting adjourned, members to spend the afternoon in visiting University of Pittsburgh, School of Dentistry, and the Mellon Institute of Industrial Research, and to convene for regular session Thursday morning.

THURSDAY MORNING

The meeting was called to order by the President at 10 o'clock.

The Secretary read the minutes of the last session, which were approved.

On behalf of Dr. Bunting, senior member, who was unavoidably absent from the session, Dr. Black presented report of the Executive Board relative to the application of the Dental Department of Columbia University for membership in the Institute, as follows:

"The Executive Board deems it inadvisable to act upon this application at the present time, but thinks best to defer action until the work of the school has made further progress. Also, the Board wishes it to be definitely understood that, as representing this Institute, the Board favors the program which has been laid out by Columbia for the conduct of the dental school. And further, it is recommended by the Board that the mem-

bers of the faculty of Columbia University Dental School be given the privileges of this Institute until such time as its application shall be definitely acted upon."

Upon motion by Dr. H. L. Wheeler, the report of the Executive Board was accepted.

Paper entitled, "The Ancillary Subjects in the Dental Curriculum," by Dr. Guy S. Millberry, San Francisco, in the absence of the essayist was read by Dr. E. H. Mauk. (See page 110). Discussed by Drs. Alfred Owre, C. R. Turner, H. W. Morgan, and E. H. Mauk.

Dr. Ellison Hillyer, Brooklyn, read a paper on "Teaching of Orthodontia in the Dental Curriculum," (see page 118). Discussed by Drs. R. Summa, S. H. Guilford, and F. A. Delabarre, Dr. Hillyer closing the discussion.

At the request of the Chairman of the Legislative Committee of the National Dental Association, Dr. H. L. Wheeler introduced the following resolutions and moved their adoption:

FIRST:

"Resolved, That this body approve the proposed law to place dentists in the Navy upon the same basis as that upon which dentists in the Army are now commissioned."

The foregoing resolution was unanimously adopted.

SECOND:

"*Resolved,* That this body urge upon the Surgeon-General the desirability of placing at the head of the Dental Corps in the Surgeon-General's office a man commissioned in the Dental Corps."

This resolution was also unanimously adopted.

The President appointed the following named members to act as a committee to prepare courses in War Dentistry in Dental Schools, including the standardization of instruments so that the instrument equipment of the dental schools and that used by Army and Navy dentists would be uniform:

H. E. Friesell, A. D. Black, H. L. Wheeler; this committee to be enlarged at the discretion of its members, and it may also cooperate with the Dental Committee of the National Medical Board of the Council of National Defense.

Dr. A. J. McDonagh, Toronto, read a paper on "Teaching of Periodontia in the Dental Curriculum," (see page 128). Discussed by Dr. J. O. McCall, Dr. McDonagh closing the discussion.

THURSDAY AFTERNOON

The meeting, held at the University Club, was called to order by the President at 3 o'clock.

The Secretary read the minutes of the morning session, which were approved.

Report of the Commission on Text-Books was presented by Chairman Hillyer, (see page 151). Upon motion, the report was accepted and the recommendations adopted.

Reports of the work done in the scientific sections were then presented by the chairmen of the following Sections: Section I, Operative Dentistry, Dr. A. H. Hipple; Section II, Prosthetic Dentistry, Dr. H. L. Wheeler; Section V, Dr. E. H. Long. (See pages 134-150). Upon motion, carried, the reports were accepted.

Upon motion, it was directed that the Secretary send telegrams of greeting to Dr. J. D. Patterson, Kansas City, and Dr. Howard R. Raper, Indianapolis, both of whom have been ill.

Dr. C. H. Hebble, Columbus, presented report of the Master of Exhibits (see page 152), which was approved.

It was moved by Dr. W. E. Willmott, Toronto, that as this meeting is the twenty-fifth anniversary of the founding of the Institute, the Executive Board be instructed to send to Dr. Thomas E. Weeks, one of the founders of the organization, a cable presenting the greetings of this body upon its silver anniversary. Motion seconded, and unanimously carried.

At the suggestion of Dr. McDonagh, Dr. A. W. Thornton moved that the Executive Board be instructed to appoint a committee to investigate and report upon the matter of adopting a standardized Examination Chart to be used in the clinic of every school, and which the patient may take with him, thus enabling instructors and students of another clinic as well as a dentist in private practice to understand the mouth conditions as shown by the chart in case the patient desired to be treated in another clinic or by a practising dentist.

The above motion was duly seconded, and carried.

Election of officers for the ensuing year then took place, as follows:

President, A. W. Thornton, Montreal.

Vice-President, Russell W. Bunting, Ann Arbor.

Secretary-Treasurer, Abram Hoffman, Buffalo.

Member of Executive Board to fill the vacancy caused by expiration of term of office of Dr. Bunting, A. H. Hipple, Omaha: the membership of the Board now standing as follows:

Arthur D. Black, Chicago, one year.

Guy S. Millberry, San Francisco, two years.

A. H. Hipple, Omaha, three years.

In surrendering the gavel to President Thornton, the retiring President said:

"I would like to have here the proper kind of gavel with which to install our new President. I do not have to ask somebody to bring him forward. He is right here.

"Dr. Thornton, five years ago you began your official career as an officer of this Institute in Pittsburgh, and we feel that it is fitting that you should come back to Pittsburgh to be installed in the highest position that it is in the power of the Institute to bestow. It gives me great pleasure to present to you this gavel, which is a rubber stamp that you can carry and use throughout the year. I congratulate you as President of this Institute."

President Thornton responded as follows:

"Dr. Biddle and members of the Institute: I am very glad to receive this rubber stamp, the official seal of the organization. I will use it on my checks and possibly they will be honored when presented at the bank. This is not the time for talking, as we have much to do. I am very, very grateful for this honor."

Being called upon for a few remarks, Dr. Hipple said:

"Mr. President and Fellow-Members: I just want to make an apology. A few years ago, before I ever had been in Pittsburgh, I told a story at the banquet connected with a meeting of this organization that ran something like this: A man who had for a great many years been in one of the departments at Washington, one day surprised his friends by going around and telling them he was about to leave Washington, that he was going to Pittsburgh—in fact, that he was going back to Pittsburgh to spend the rest of his life. And to one of the friends who had been very close to him he said, "I am going back to Pittsburgh to die." And the friend said, "I did not know you came from Pittsburgh." "I didn't," was the reply. "But I didn't know you ever lived in Pittsburgh." "I never did live in Pittsburgh," he said. "Well, then," exclaimed his friend, "in heaven's name what are you going to Pittsburgh to live and die for?" "Because I think I could leave Pittsburgh with less regret than any other city in the United States."

I want to apologize for that story, and to say that after having been here I do not know of any city I would leave with more regret than the city of Pittsburgh, because in no other place have I been so highly honored."

The President appointed the following named members a committee to consider the recommendations made in President Biddle's address as to graduate and post-

graduate work, the curriculum leading up to the various degrees, etc., said committee to present its report at the next meeting: Drs. A. D. Black, Chicago; Guy S. Millberry, San Francisco; A. E. Webster, Toronto.

On behalf of the Executive Board Dr. Black announced that determination of the place of meeting next year would be deferred until a later date.

The Secretary read the minutes of the session, which were approved.

Dr. W. E. Willmott, Toronto: "There is one other thing we should do on this occasion, and that is to take action expressing our appreciation of the efforts of our President during the last year and especially during this meeting. Personally I would like to congratulate him on the way he has conducted the meeting and also on the success with which he presided at the banquet last evening. I therefore move that a vote of thanks be extended to Dr. Biddle for his efforts during the past year."

Motion seconded, and unanimously carried.

Upon motion, unanimously carried, a vote of thanks was extended to the University of Pittsburgh, to the School of Dentistry, and to the local committee of arrangements, for the many courtesies extended and the entertainment provided, also to the S. S. White Dental Manufacturing Company for furnishing the programs, and to the hotel management for courtesies received.

Adjourned.

ABRAM HOFFMAN,
Secretary.

ADDRESS OF WELCOME.

Hon. Edward V. Babcock, Mayor of the City of Pittsburgh.

Mr. President and Delegates to the Twenty-Fifth Annual Meeting of the American Institute of Dental Teachers:

IT gives me great pleasure to appear before you to extend a word of welcome on behalf of the citizens of Pittsburgh. During much of the time of your three days' stay you will be the guests of the University of Pittsburgh. It is in the dual capacity of Mayor of this city and as a trustee of the University, of which the Dental School is by no means an unimportant part, that I address you.

The purpose of your organization, being to develop and elevate the standards of dental education, meets quick response in this community. Everything that contributes to the spirit of education in all of its varied forms finds fallow soil in Pittsburgh. Contrary to the too prevalent belief that Pittsburgh's only claim to distinction is its tonnage and commercial supremacy, those of us who are interested in the educational life of Pittsburgh point with pride to the splendid setting in which this convention is held. This very spot is surrounded by institutions which comprise a center of education and art such as few cities can boast of. The University of Pittsburgh alone, with its miraculous strides within recent years, has challenged the admiration of the educational world. The Mellon Institute of Industrial Research has attained a place in its brief history that entitles it to rank as one of the notable institutions of its kind in this country.

I may be pardoned if I refer to the enviable place our own Dental School occupies with her 333 students and 57 teachers. Likewise, I may be pardoned if I refer to the splendid contribution made by some good friends of mine in the development of a filling material produced by Dr. C. C. Vogt of the Mellon Institute under a Fellowship owned by the Lee S. Smith and Son Manufacturing Company. Viewed from the broad angle of measuring up to its highest possibilities, Pittsburgh in its Dental School, research work and its commercial dentistry referred to, deserves high rank.

In glancing over your program I note that the spirit of the times is grasped by the subject assigned to Dean Friesell, "The War Duties and Opportunities of Dental Schools." I presume the Dean will elaborate on the well-known theory that "An army travels on its stomach," and arguing backward from that will prove that without good teeth the functions of the stomach will interfere with traveling, and, therefore, the dentist is the fellow after all who is going to win the war. All humor aside, the patriotic instincts which permeate our University of Pittsburgh Dental School have produced a creditable record. Twenty-nine members of the faculty have received commissions as First Lieutenants in the Dental Officers' Reserve Corps of the United States Army; six of this number are at present on active duty, three of them being already in France, and the other twenty-three are on call. Fifty-one of our Alumni are on active duty in the Army Dental Service at present, and 109 more are commissioned and are awaiting assignment to active duty. This makes a total of 160 Alumni of the Dental School who have received commissions as First Lieutenants in the Dental Officers' Reserve Corps.

During your stay here you will be privileged to see and learn of the potent part the great industrial district of Pittsburgh is playing and will continue to play in the great world war. The patriotism which inspires our people is coloring every branch of activity. We are

proud of the part that we are playing. But we are also anxious that in pursuit of the work of upholding the arm of national service in every line of activity, we do not grow lax in our devotion to those ideals of education and scientific advancement which, after all, furnish the greatest contributions to the progress of the human race. As before stated, the Pittsburgh ideals are plainly demonstrated in the development of the very science which you, as delegates from forty-six dental schools in the United States and Canada, have directly to do.

Before closing let me say that you have come to a great city. Pittsburgh to-day is the most important city in the wide world. I stand up here before you in my extreme youth and inexperience and make that declaration. No city in the whole land is as conspicuous as is our city to-day. We are an industrial city, and in that one respect, NOW, of all times in the history of the world, we stand out in a class by ourselves. More is expected from us in the great crisis that we are now in than from any other city. You chose wisely when you came here. You will, I am sure, find among our people a welcome that will, I hope, make you feel like coming back when you have another convention to hold. We are an educational city. We have right in this vicinity our recreational headquarters. Pittsburgh stands out conspicuous, too, as a financial center. Of course, finances and the great industries that we have here go hand in hand, and now we have risen to the full heights of patriotism. In connection with the war, nothing that cooperates or correlates with it finds our people behind the times or a "slacker" to the extent of one per cent. When the Government asks for finances we, according to our population, take the lead. No matter whether it is selling Government Bonds or asking for contributions to Red Cross work or Y. M. C. A. work or any other activity, we now realize that we are ALL in the war. And you, my friends, I care not from where you come, must realize that you are soldiers now, and it doesn't make any difference whether you have a uniform on your back or not, you must join us in the belief and feeling that we are in the war, no matter what life we lead or in what activity we are engaged. Our ladies, our daughters, our boys, are all doing their part, they are all soldiers now. The spirit of patriotism is running rampant amongst us. The more we can enhance it, encourage it, and help out, the better citizens you and I are, there is no question about that. We may roll along in this world and do ordinary things—buy and sell and trade and not do anything of special note, but when we initiate, create and dig up something new in this active stage of the world's history, we stand out a little conspicuously. And that is what my friends the Smiths have done. I am told, in producing a commodity not known before—something new. Therefore I am proud of them as having done something conspicuous and I commend them to you because they are among our leading citizens—there are no better in Pittsburgh.

There has been prepared a feast of good things in a way that will enable the hospitality of Pittsburgh to be demonstrated anew. Any reasonable courtesy that can be extended by the city administration, in connection with the efforts of the local committee, I gladly offer. I welcome you to our city. May your stay be profitable and pleasant.

RESPONSE TO THE ADDRESS OF WELCOME.

D. M. Cattell, A. M., D. D. S., Memphis.

Mr. Mayor, Mr. President, Members of the Institute, Ladies and Gentlemen:

I FEEL like the small boy did when he was called on to get up and speak; I feel so little. Years ago, yes, a good many years ago when I first landed in Chicago and undertook to make a little talk before the local Dental society, a few of the older men, like Dr. Brophy now, sat down on me pretty hard, and ever since then I have been afraid to talk before dentists. That is a condition that I cannot get over.

We have been welcomed to this city in a most cordial way. If Boston streets were laid out along calf paths, then Pittsburgh surely has one on it because it must have been the hog that nosed around here and there and rooted a little pathway one way, and then turned around and rooted thru to the wilderness until he got back to his own hog trough. I have been lost three times already in this city, and I have had guides too, but sometimes got away from them. To me Pittsburgh is the labyrinthian maze, the one city to get lost in. There is always somebody, however, that will help you find the lost wallow.

We have come, as Pittsburghers know, from all over the land. I come from a section where it is supposed that the flowers are in bloom. I remember one time standing before you and inviting you to come down there and hold one of these meetings. I told you of blooming flowers and green verdure, I told you of many things going on down there that are usual to the summer season. This time I left fourteen inches of snow, the river frozen over, and many hours that were too cold for comfort. I came North to thaw out. I am thawing rapidly, not under weather conditions however, but under the splendid warmth of friendship and kindness of the good people of Pittsburgh.

Now, Mr. President, I cannot go into detail as to how we feel and how glad we are that we are here. We have been here before, and were treated so royally, we were treated to such wonderful entertainment, that we have come back. We are hard workers, but we know how to play when play-hour comes, and I remember one night here a few years ago when we played for three or four hours in a way that I never played before, and I doubt whether we will ever get the chance to play so again. I remember that one of our fellows had a little book presented to him the cover of which was about the size of this table-top and the thickness of which was something like that (indicating), and it required a two-man wagon to bring it in for presentation. And there were present on that occasion all those things that go to make up a royal time. We are not looking for such entertainment now, we are thinking of many that are "over there," we have the feeling that others are going. I have just received a letter from my own boy. He expects to soon be there. And so, gentlemen, we have work before us of a peculiar nature, different from what we have had before, we must be prepared, we must prepare our students and ourselves for this great occasion.

I dare not allow myself this morning to feel so patriotic as I do sometimes, for it carries me away. I am supposed to be an old man—I have been told that I am by two or three of the gentlemen at headquarters in Washington. I went to a Government representative in Memphis who stands very close to the officers in Washington, and said to him: "I can stand just as much as three-fourths of the young men that you are taking in

now." But they would not accept me down at Memphis, so I slipped over to Washington to see if I could not somehow get into the Army service. And when I made that statement to the officer, he patted me on the shoulder and said, "Ah, yes, Doctor *just three days!*" I have really been an old man since, but I'm sorry—I would like to be over there.

I have felt that the first article which appears in the American Magazine of February, and which was written by a great man, is pertinent at this time in that it is asked: What would Jesus do if He were on earth to-day? What would He say, what would He encourage us to do? We have been taught that He was a great peace man. Yes, but not "at any price." All His teachings, as I have read them, indicate that we to-day are fighting for the principles that He taught and until we win that battle we have fought in vain.

As I look into the faces before me, I recognize many who have younger brothers, sons or nephews who have gone to battle against the despoiler of homes, of principles and of God-given rights. These young men have gone to fight the despot in his own domain that our beloved land may not be fouled by the blood of the ravisher. Our sons have been so reared that they love their flag, their country, their mothers and their sisters and will fight till the last drop of blood runs from their veins for the purity of our homes and the good of our beloved freedom. We weep at the going of our boys into the maelstrom of war. We mourn over the loss of our sons that fall in battle, but we are proud of their going and we glory in their endeavor. We praise God that we have such noble sons. I thank you.

GRADUATE COURSES IN DENTISTRY.

PRESIDENT'S ADDRESS.

By J. F. Biddle, D. D. S., Dental School University of Pittsburgh.

WHILE considering the subject of the President's address, the speaker recalled a statement that was made at a previous meeting of this Institute to the effect "that in one city alone, thirty malpractice suits were pending against as many members of the dental profession, as the result of the teachings of certain well-intentioned radical men who had given so-called post-graduate courses in dentistry." This statement influenced materially my decision to make, not only Post-Graduate Courses in Dentistry, but Graduate Courses as well, the subject of this address.

It is the belief of the writer that one of the greatest needs in the dental profession today is to extend the work of the colleges beyond their four years' curricula so that they will adequately meet the needs of the large and constantly increasing number of progressive dental practitioners who are earnestly striving to satisfy the demands of their profession for highly skilled and intelligent dental service.

Scientific research investigations within the past few years, with their corresponding acquisition of knowledge, have so enlarged the scope of dentistry that many of its methods of practice have been completely revolutionized, thus making necessary a pronounced amplification of dental courses. This condition renders it important that the schools provide adequate post-graduate courses for men who have been in practice for a number of years; and suitable graduate work for the recent graduate who is desirous of carrying his professional study further than the regular curriculum.

The speaker believes that an admirable way to develop this field with a desirable uniformity, and to secure its early adoption, would be to have the faculties represented in this Institute decide upon the character of the work most needed.

To carry out this plan and to provide for a graduate faculty, present faculties, no doubt, will have to be enlarged by the addition of outside talent, either permanently, or specially, for the occasion. In any case this work should be under the supervision and control of the organized teaching bodies of the profession. There are many men, not members of school faculties, who would be available for this work, and whose connection with the graduate faculty and the resources of a school would prove advantageous to them, to the school, and to the work. This plan would do much also, to eliminate the unqualified teachers of post-graduate courses.

The writer has endeavored to obtain the consensus of opinion of representative dentists upon the question of post-

graduate and graduate courses, to which end questionnaires were addressed to the forty-nine presidents of State societies, the secretaries of all State Boards, and the deans of all the colleges of the Institute.

We shall consider first replies received from men not connected with, nor materially interested in the Institute, namely the presidents of State societies, and the secretaries of State Boards, from whom replies were received as follows:

1. Are you in favor of Dental Post-Graduate Courses for practitioners? Fifty-two answered "Yes."

2. Are you in favor of independent Post-Graduate Courses conducted by individual dentists forming classes for their individual profit? Twelve voted "Yes;" 39 "No;" and 1, no answer.

3. Are you in favor of Dental Schools giving extension Post-Graduate Courses to dental practitioners? Fifty-one votes "Yes;" 1, "Not sufficiently posted to make any reply."

This data is significant: It is indicative of the fact that altho 100% are in favor of post-graduate courses in dentistry, less than 25% are in favor of having such courses conducted by individuals. It is evident, therefore, that post-graduate courses are in demand, and if this be the case, our schools should devise some plan to provide them.

Of forty-six schools holding membership in this Institute, only eight are offering post-graduate work, altho to judge by replies of the deans, every school is in favor of same. It appears, then, that the majority of our schools assume that their responsibility to the student is terminated with his graduation. In reality, this is the beginning of his education,—his initiation into the practical. This is the time of all others in his life he would appreciate most a correspondence, or information bureau, where he might write or call in person, present models, or data regarding cases in practice, and be advised as to their best mode of treatment. In addition to this feature, each school should have its own pathological laboratory, where specimens, swabs, etc., could be sent in for examination and diagnosis. This department should be open to every dentist within the school's jurisdiction, who wishes to avail himself of its use. A small fee, sufficient to cover expenses of operation, could be charged. Office technic for the dentist should be included, in order that this work could be carried on by a definite plan thruout. Such a department would furnish a great deal of clinical material for use by the schools; be of great service to the dentist, and give him practically all the advantages of his own pathological laboratory, which the average dentist has neither time nor money to develop.

In order to encourage the better type of student to take up graduate work and to develop real value in it, one year, at least, should be required, and a graduate or advanced degree, such as, Doctor of Dental Science, for instance, should be given. This does not mean that a dentist be required to retire from his practice for one year to pursue graduate work, unless he so elects, but that the course be arranged to suit his convenience, thru one year or a number of years, day or evening, to cover the prescribed course of study on required or elective subjects, to entitle one to advanced degree, at least one half number of credits required for degree, to be acquired in resident work in Institution. For instance, much of this work might be done by night courses at the school, or extension courses in other cities, if sufficient demand be developed therefor. As required work upon each subject is completed, grade cards containing record of credits might be issued. Thus the work could be continued from time to time, until the aggregate courses totaled sufficient credits to entitle the student

to advanced degree. In this way, one or a half dozen courses might be taken, regardless of credit for same, individual advancement being paramount, credits, secondary.

The following is offered as a tentative schedule for Graduate Courses:

	Subjects	Lectures	Demonstrations	Laboratory
1.	Dental Pathology.	20 hrs.	10	10
2.	Radiology	10		4
3.	Anesthetics	15	15	
4.	Minor Surgery	20	10	20
5.	Oral Hygiene	5	5	
6.	Bacteriology	20		60
7.	Pathology	20		60
8.	Dental Histology..	15		60
9.	Operative Dentistry	10		30
10.	Prosthetic Dentistry	10		30
11.	Crown and Bridge Work	10		30

Thesis—An original article on some problem of dentistry requiring study and investigation to be submitted by each candidate for degree.

The exact number of hours devoted to each subject in lectures, clinics and laboratory with credits for same, should be determined after course has been outlined in detail by various teachers of these subjects. To be of most value, such a course should include both the practical and scientific phases of dentistry. For after all, the acquisition of knowledge, unless it be accompanied by the skill to apply it, availeth little; and in dentistry this power consists largely in one's ability to correlate the practical, scientific and theoretical parts of his education, that it may prove of greatest service to the human race.

Graduate Degrees under consideration by various schools of Institute:

1. Doctor of Dental Science—One year's work, at least, required.

2. Master of Dental Science—One year.

3. Bachelor's Degree for four years' course in dentistry; Master's Degree at end of fifth year; Doctor's Degree, within one or two years thereafter.

Thus far, one school, only, is offering a graduate course and conferring a degree, but as correspondence with deans who have thought sufficiently upon the subject to express an opinion upon it, indicates there is a widely different idea as to the degrees to be conferred, it would seem to be indicated that some uniformity is necessary. Otherwise, we shall have a half dozen kinds of degrees in as many institutions, which in reality, are conferred for identical courses. Now is the time to adjust this matter before many graduate courses are inaugurated, or many such degrees conferred.

Courses in War Dentistry.

Not every school in our membership may be equipped to offer graduate courses to graduates and practitioners, but, in the present world crisis, it is the duty of every dental school in the United States and Canada to establish courses in War Dentistry.

Such courses might profitably be divided into four parts:

a. Anatomy: Lectures and dissections of head and neck.

b. First Aid Work:
   Bandaging of wounds.
   Reduction of fractures.
   Assuming general direction of patient until arrival of medcal aid.

c. Infections and Inflammations.

d. Study of Equipment of Army Dentists and Operations Required of Same.

A committee should be appointed to collect all necessary data, outline courses, and distribute such information to respective members. Such courses to be offered upon recommendation of American Institute of Dental Teachers, and to consist of day or evening classes as occasion demands, to teach dentists within their jurisdiction first aid work, as well as the essential features of governmental requirements. These courses

would in no sense cover the work required of men who take up head surgery, which of necessity must be covered in special courses and which every school is not equipped to give. No one can tell how long this war may continue, or how many of our men may be called to the service, hence we should equip ourselves to the fullest degree of efficiency, fitted to do our part in any emergency, rather than to enter the service untrained and unskilled in such particulars, and be compelled to waste valuable time in the acquisition of rudimentary essentials. Upon receipt of plan outlined for this work, it is suggested, that schools adopt it promptly, thereby encouraging this movement.

Briefly stated, the matters upon which the Institute's action is respectfully urged are as follows:

1. Systematic graduate and post-graduate courses should be established, and to this end a committee should be appointed to work out a detailed plan for their operation, to be submitted to this Institute at its next meeting.

2. Courses in war dentistry should be inaugurated in all our colleges, and to this end a committee should be appointed to work out details and submit them to deans of all Institute colleges, suggesting their immediate inauguration.

This occasion commemorates the twenty-fifth anniversary of the founding of the American Institute of Dental Teachers. At the time of its inception, dentistry had made no organized or scientific advancement other than what had been accomplished by a few men, who by close application of mechanical and scientific principles had succeeded in evolving methods far in advance of their times, but which were designed more for the benefit of the particular operator and his following, rather than for the profession as a whole.

However, with the organization of this Institute, whose avowed purpose was the systematic teaching of operative technics in dental schools, the teaching of dentistry has been elevated to a higher plane, there has been a wider dissemination of knowledge, additional inspiration to study and research work, until now dentistry has come into deserved recognition on account of its high standards and its importance as a branch of the healing art. The greater enthusiasm for this work, its higher ideals, incentives to new and better methods, developed, in large measure, by the work of this Institute, and by the men, who have contributed to and controlled its destinies, has reflected a corresponding influence upon our student body, and each year we are graduating a better equipped class of students, to cope with problems that will confront them in every day practice.

In conclusion, therefore, the speaker desires to pay tribute to the founders of this Institute, and the men who have succeeded them as officers of this organization, thru whose efforts this Institute has advanced to its present sphere of service, and has proved such an important factor in standardizing the teaching methods of our dental schools.

Note:—Upon unanimous vote of Institute a committee composed of the following men: Dr. A. E. Black, People's Gas Bldg., Chicago, Ill., Dr. Guy S. Millberry, San Francisco; Dr. A. E. Webster, Toronto; was appointed by the chair to formulate plans to carry out suggestions embodied in President's address. Readers that have any suggestions to offer along these lines are requested to communicate with any of the above mentioned committee.—Editor.

Discussion.

Ellison Hillyer, Brooklyn.

It has been my good fortune to have listened to the presidential addresses every year since 1899, with but two exceptions: One due to unavoidable absence and the other when I had the honor of addressing you from the chair and listening was not required.

A perusal of these several addresses would unquestionably corroborate what Dr. Biddle has said regarding the influence of the men who, for the quarter

century past, have guided the destinies of the Institute. No doubt the inception of the work of this body in 1893 by a small number of earnest workers was the result of natural processes. Prior to that time the development of the profession was erratic and spasmodic and, in some ways, detrimental rather than beneficial in character. The Institute's beginning marked the passing of the two-year curriculum, with its indefinite methods and standards, to the three-year course, which demanded more specific and definite lines of teaching. Influenced by the somewhat chaotic state then existing, such men as Dr. G. V. Black, of sacred memory, Drs. Cattell and Morgan, whom we trust may be spared to us for many more years of activity, and "dear old Tom Weeks," whose migrations have carried him to southern climes,—all these men realized the necessity of some organization to bring about some measure of order. Their efforts with those of several others made the work of the National Institute of Dental Technics what it was for the first few years of its existence. Hardly had its technic teachings been fairly established before it was realized that its scope was limited by the needs of the enlarged curricula. The change to the "National Institute of Dental Pedagogics" made it possible to broaden materially the range of its operations, and, in all probability, no change would have been deemed necessary in name except that it became necessary to explain to many just what the Institute name really stood for. Then, too, we were more than a national body. With our four confreres across the border we were in reality "international," and hence the appropriate change to the present name of American Institute of Dental Teachers.

It may seem that I am not discussing the President's address but indulging in reminiscence. It is not usual to discuss the last of an address first but I have digressed purposely in order to make apparent what passed thru my mind as I read this presidential communication. All these changes that have marked the quiet, forceful progress of this unassuming body have been leading us, who form the working force of the colleges, along definite lines of progress. As the colleges have progressed, the profession has advanced and your President is correct in his statement about the graduate of today. We are now entered upon the operation of the four-year course and still we feel that the tremendous scientific impetus which has been given the profession in the last few years will outstrip our efforts to adequately prepare the graduate for his career at the end of even this period.

This, added to the fact that this same progress has resulted in leaving behind the non-student graduate, and even the graduate who is desirous of keeping up and is depending upon his own efforts to do so, makes the President's plea for a definite post-graduate course a wise one. We cannot keep on adding years to our course. Rather, more earnest attention should be given to the rearrangement of the preliminary courses and greater co-operation should be sought with the various "powers that be" in obtaining for our future students these desired changes in their early training.

In analyzing the President's tentative schedule, it appears that he has included all the subjects desired except Orthodontia. Possibly he places this outside the proposed course and there are arguments *pro and con* such a plan. It is, however, a specific post-graduate dental subject. As I have to present this matter later in the session, I will not amplify upon it at this time.

Regarding the first eight subjects on the list, I am not in a position to question whether or not sufficient time has been allotted to properly meet the requirements. Nos. 9, 10 and 11 I feel should

have more time than has been allowed. Possibly, in the reference of the recommendation to a committee, we will be given a re-arrangement which will better subserve the needs of the general course. It is my impression that this work should be carried on by a definite post-graduate faculty whose efforts should be primarily devoted to the work. It will be necessary to make these courses more than evening courses unless much less time than is indicated is given, and it would appear that Dr. Biddle's estimate of 489 hours is a minimum rather than a maximum. In other words, in thirty-two weeks, ten hours a week would give a total of 320 hours, 15 hours a week 480 hours, 25 hours a week 800 hours, and 40 hours a week 1280 hours, if I am correct in the casual figuring I have done.

As to the degree: Most certainly we should unite at the outset upon a suitable one. Whether our State laws will aid or hamper us in our several localities remains to be seen.

The President's recommendation regarding the course in War Surgery needs no comment other than to say that we as colleges stand absolutely back of our governments and the boys who have gone and are going to the front. As individuals we simply ask, "What is desired?"—and the response will go forth, "Whatever is asked, be it easy or difficult, we will do if it is in our power." We are constantly making sacrifices and will continue to make them till the end, whatever and wherever that may be. As colleges it is our manifest duty to carry the plan forward to the best of our ability.

J. H. Kennerly, St. Louis.

After a careful reading of the President's address, I find myself to be so thoroly in sympathy with the ideas expressed by him that it seems to me that whatever I may say will simply be a reiteration of what the address contains.

It is impossible for me to conceive of one finding anything in the address to criticise. Certainly, we must all agree with him when he says that, "one of the greatest needs in the dental profession today is to extend the work of the colleges beyond their four years' curricula, so that they will adequately meet the needs of the large and constantly increasing number of progressive dental practitioners who are earnestly striving to satisfy the demands of their profession for highly skilled and intelligent dental service."

Scientific research, which he so highly recommends, seems to me to be absolutely indispensable to the future success of the dental profession. The present conditions met with, and which are so frequently brought to our attention by reference from the medical profession, emphasizes the absolute importance of making the dental curriculum more scientific. More time should be given in the dental school to the subjects of biology, pathology and bacteriology. This is emphasized, to my mind, by the frequent applications from men who have graduated some years ago who are now seeking post-graduate work in these particular subjects. While operative and prosthetic dentistry are, I think, adequately taught in all schools, the sciences above referred to, do not receive the attention, in some institutions, which they deserve. If it is impossible to give the time required for this work in the regular curriculum, then, certainly, post-graduate courses should be established whereby the work could be had by men who earnestly desire it.

I know of no body of men so amply qualified to outline a course of post-graduate instruction as can be found in this body, and heartily favor the recommendation that a Committee be appointed to formulate a course which can be adapted to all schools in this association, and report it for action at our next annual meeting. Just how this shall be done, in my estimation, should be left

to the Committee and not take up the time of this meeting in discussing the whys and wherefores of the proposition.

The questionnaire sent out by our President speaks for itself. It is 100 per cent in favor of giving post-graduate courses in the dental schools, and I am surprised that so many are in favor of post-graduate work being done by some individual whose primary motive in giving such work is the accumulation of dollars. If the independent post-graduate teacher's work is meritorious, certainly his work can be incorporated into the work of a regular educational institution and thereby lend greater efficiency to the work.

"Of forty-six schools holding membership in this institution, only eight are offering post-graduate work." Just why this is true might be interesting to ascertain. Some schools believe in conducting their post-graduate courses simultaneously with the regular course of instruction, or during the college year, while others feel that it is better to conduct a post-graduate course during the vacation period. To the latter class I claim allegiance, for I believe that having accepted a class of students we should allow no other influence to detract from our effort to give them the very best that lies within our power. So few institutions have sufficient full-time men for giving post-graduate work during vacation period, consequently, the matter is neglected. I hope, however, that some solution may be arrived at by the committee suggested by the President. The value of a pathological laboratory to the dental profession is inestimable. I believe that the dental profession would occupy a higher position in the United States army today if more attention were given to the strictly scientific part of the dental curriculum. Too much encouragement cannot be given to graduates to urge them to continue their studies after graduation.

For some time the faculties of Washington University Medical and Dental Schools have been discussing a plan whereby the dental student could receive the M. D. degree in less time than would ordinarily be required by taking the medical degree first and the dental degree following, which now, in our institution, would consume about seven years. If the medical profession would be a little more liberal in their demands and realize certain fundamental subjects necessary to the practice of dentistry as equivalent to certain others in the practice of medicine, a conclusion might be arrived at whereby such a course could be consummated in five years.

As to the curriculum for post-graduate courses, suggested by the President, I see no reason why it should not be adopted, provided the hours in each subject correspond with the hours demanded by the educational institution teaching the subject.

Concerning the course in war dentistry, and I speak from experience, having taken part in the teaching of three classes in the Officers School of Neurological, Plastic and Oral Surgery, established by order of the Surgeon General of the Army in Washington University Medical Schools in October, 1917, too much emphasis cannot be placed upon the lack of preparation by the dental profession for the handling of such cases as result from the terrible war now in progress in European countries, to which the American soldiers are going day by day and who will very soon be returning from the front with demands for the greatest skill that human ingenuity can devise. How frequently I have heard the men taking these courses say, "How I do wish that I had been taught more of this when I was a student." While it is sure that the work of the dentist in the field and base hospitals will be to a large extent, mechanical, yet the lack of the knowledge of the treatment of wounds will be a very great handicap to the dental surgeon. My suggestion in this

particular would be that, anticipating the time that we arrive at the fourth year in the four year course, upon which we have just started, that wherever possible instruction in war surgery, splint making., etc., be taken up, but upon arriving at the fourth year of the dental curriculum these subjects be made a large part of the course of instruction for that year. So, that it may not be said of us in the future, should the occasion ever arise, (God willing that it never shall), that we were not prepared. Hence, we should (to use the words of our President) equip ourselves to the fullest degree of efficiency, fitted to do our part in any emergency, rather than to enter the service untrained and unskilled in such particulars and be compelled to waste valuable time in the acquisition of rudimentary essentials.

Arthur D. Black, Chicago.

I will confine my remarks to the subject of post-graduate courses. We need courses especially for the recent graduate, altho others should be eligible for them. These should occupy the time of at least a full school year, and should lead to a degree upon the presentation of a thesis, as suggested in the President's address. Courses of this type should be given to prepare for special lines of service. Those who expect to practice orthodontia should remain for another year, after completing their regular school course, to take a special course in this subject. Those who expect to specialize in oral surgery, those who intend to devote themselves more especially to treatment of diseases of the soft tissues of the mouth, and possibly also those who intend to devote their time especially to prosthetic or to operative dentistry, should have a year of extra training. My thought is that one's time should be very largely devoted to a particular line of study, which would include all closely related subjects. One taking a special course in orthodontia, for example, should devote a part of his time to a careful review of dental histology, and should make a special study of the nose and naso-pharynx, etc. One taking a graduating course in oral surgery should make a very thoro dissection of the head and neck, should have a special course in bacteriology, and a course in general surgery, which should include attendance at hospital clinics, etc.

This type of course is difficult for our schools to handle because the number taking a particular course would be few, and they would require many hours' attention from the head of the particular department. This means that the teachers of these special courses must be either full-time men, or at least half-time men. I do not see how these courses could be carried out properly on any other basis, and very few schools have full-time professors in those subjects in which there would be much demand for such courses.

There is a large demand for intensive courses for men in general practice. These courses should be so arranged that they will be convenient for practitioners living in the city in which the school is located, as well as for those who come from a distance. Practitioners living in the city in which the school is located would prefer to spend possibly three half-days a week in the school, and devote the remainder of their time to their practices while taking these courses. The schedule for such courses should extend over a period of a semester, or possibly one school year. Those men who come from a distance, closing their offices for the time, would prefer to cover the same ground in a shorter period by devoting their full time to the work. They should be able to cover in one month the same ground that the other group would in a semester. These two forms have been presented in the announcements which have been sent out in the post-graduate work of Columbia.

A school which is doing teaching of

this kind must develop a good research department, because it must be doing real work to advance our knowledge and many new things must be tried out and their value proven.

At Northwestern we have been giving post-graduate courses for a number of years, and I wish briefly to refer to some of our experiences. We have given a four-weeks' intensive course. Until last year this course was given immediately after the close of the school year; it was never quite satisfactory either to the classes or to us. There was the lack of animation, produced by a comparatively empty large institution. It was like a party of 25 or 30 couples in a ball room which would accommodate 250 couples; a chilly affair. Last year we gave our course in February, during the busy time of the school year, and it was so much better for both the post-graduates and for ourselves, that there really was no comparison. I appreciate what Dr. Kennerly has said about our duty in devoting our time to our students for their regular studies, but I believe that very few teachers are devoting so much of their time to their regular teaching that they cannot devote whatever time is necessary to the post-graduate work for a few weeks during the regular session. Not only does the post-graduate student have much more enthusiasm in his work, but there is an impression left with our own students; the thought is placed in their minds that perhaps some time they ought to return for post-graduate study. I believe the sowing of the seed of this thought is well worth while.

We have found difficulty in getting post-graduate classes to do much operating in connection with these courses. I think the principal reason is that we have not had a separate clinic-room for them. A man who has been in practice for several years, and who has become a little rusty, if I may call it that, as to some of the technical details, hesitates to operate among a group of students who may ask questions that are embarrassing. This year we have provided a separate room, so that all the operations of post-graduates will be done apart from the clinic of the regular students. We are looking forward with interest in this feature of our course next month.

As to the teaching which we should give for Army dental service, I hardly know what to say. Ordinarily we would expect the teaching to be directed towards the service that is to be performed. Yet under the present regulations covering Army dental service, by which each enlisted man in the army is provided an average of two hours a year in the dental chair, they must go in and out like clock-work and it is absolutely out of the question for men in the dental corps to practice good dentistry. Many fine young dentists will be spoiled in the dental service under present conditions. They will all need to come to post-graduate schools when the war is over.

In the planning of courses for Army dental service, there are certain items which we feel ought to be included. The dentist who enters army service ought to be as familiar as may be with plastic and oral surgery, even tho under the regulations he is not privileged to operate on the soft tissues. We all know, however, that when these men get into a base hospital and patients are coming in faster than they can be handled, dentists are going to be given opportunity to do whatever they are able to do. And for that reason we ought to expect that those men in the service who have ability will have opportunity to do some things which are not provided for in the regulations. At any rate, it certainly will be a great advantage for every dentist in army service to know as much as possible of the anatomy of the head and neck and plastic and oral surgery.

Briefly stated, our course will give 30 hours in dissections of the head and neck, eight hours in surgery of the cada-

ver by demonstration; 36 hours in strictly oral surgery clinics, 22 hours in the making of splints for the treatment of fractures, 20 hours in surgical clinics at hospitals by general surgeons, those clinics being as largely surgery of the face as the material will permit; and 20 other hours in related matters such as radiography, anesthesia, extraction, etc. This makes 136 hours of laboratory, clinic and demonstration periods, to which should be added about 36 hours of lectures covering the same subjects, making a total of 172 hours in four weeks.

In the course for the general practitioner of dentistry, naturally much of the surgery is omitted, reducing the oral surgery to 24 hours, and including 48 hours in operative, prosthetic and orthodontic procedures.

Our school, like Washington University, has had one four-weeks' course for the Plastic and Oral Surgery Division, under the direction of the Surgeon General, and we have another one scheduled commencing the fourth of March. For this course our own school and the members of its faculty give a comparatively small part of the work, the teaching staff being composed of the members of the faculties of the other dental and medical schools in Chicago and surgeons operating at the various hospitals.

I wish to strongly support the suggestion of our President that committees should be appointed to investigate the question discussed in his address. I hope that the committee suggested relative to the work which is to be done by our schools in the matter of war dental service, will be able to make a report at this meeting, because this is a matter which ought not to lay over. I am sure that each member of the faculties of our schools is quite willing and anxious to do his part in order that those men who are going into the dental corps shall render the best possible service, thus reflecting credit upon the dental profession and those of us who are teachers.

F. B. Moorehead, Chicago.

At the present time there are two courses of instruction under government direction; first, the course in plastic and oral surgery under the direction of Major Vilary P. Blair of the Surgeon General's Office, the object of which is the special training of men to participate in the plastic and head surgery units. The second course is one given by the committee on dental education, the sub-committee of the Dental Committee, general Medical Board, which has as an object the preparation of men for military dentistry. Courses have already been given at the University of Michigan, University of Minnesota, University of Pennsylvania, Northwestern University, Chicago College of Dental Surgery and Forsyth Infirmary.

Courses under the direction of Major Blair will doubtless be continued, but the courses under the direction of the Committee on Dentistry will scarcely be needed inasmuch as the Surgeon General has organized a school at Fort Oglethorpe for the military training of members of the Dental Officers Reserve Corps.

In the matter of post-graduate work, we should differentiate between graduate work and post-graduate work. Graduate work is one thing, and post-graduate work is another thing. The question of the status of graduate work is well defined, and colleges and universities have adopted well known standards governing graduate instruction. No activity in university life is more closely surrounded by iron clad rules than that of graduate instruction. In the first place the graduate student must have certain definite preliminary education before undertaking graduate work. In the second place the graduate student is taking a course which leads to a higher degree. In the third place the teacher in a graduate institution must have certain scholastic attain-

ments before he can give instruction to graduate students. For example, at the University of Illinois no man can become a member of the graduate faculty who has not a Doctor of Philosophy degree, for the simple reason that many of the graduate students are taking a doctor of philosophy course and it would be an anomalous situation for a teacher to undertake to teach a course for which he himself had no credit. It would seem, therefore, that when this body takes the question of graduate work he should do it with a feeling that the standards will be in keeping with those already inaugurated by our best universities.

I imagine it will be some time in the future before any appreciable amount of instruction in graduate work in dentistry will be possible, as we do not have many students with bachelor's degrees coming to us. The question of post-graduate work should be taken up by this body, and in some way or other standardized. Post-graduate work in this country is in bad shape. A man will leave his practice and take a trip of ten days or two weeks to Chicago or New York or some other educational center, advertising the fact in his local papers that he is taking a post-graduate course in some institution, and then when he arrives he will spend his time enjoying life and possibly attend a few clinics. He again takes advantage of his return home to advertise the fact that he has completed a post-graduate course. It seems to me that this is the worst kind of advertising, and no institution should permit a man to come in for work unless he does so under definite prescriptions. He should remain a specified length of time, and do a certain amount of work by the clock. For the man who wants to learn, and is anxious to improve himself, the doors of the university should be wide open, but the fellow who comes to loaf for a few days, picking up perhaps an idea or two which he may exploit on his return home, should not be allowed the privilege of the institution. I am always glad to have men visit my clinic who may be passing thru Chicago, but the student who is coming for business ought to stay a certain length of time and do a specified amount of work. It would not be a difficult thing to have a minimum requirement for post-graduate instruction. As Dr. Black has suggested, we should make some provision for the student who asks for special training in prosthetic dentistry or operative dentistry or therapeutics. Our institutions should encourage conscientious seekers after higher training and discourage the loafer by refusing him admission.

Alfred Owre, Minneapolis.

So much has been said in regard to post-graduate instruction that we ought to have the term well defined. We tried to do that last year. It is used in an ambiguous sense at the present time. The President states that he has sent out questionnaires. I wonder if, instead of post-graduate work, they do not refer to extension work for three or four weeks or something like that. There are only eight schools offering graduate work, where if a man is qualified he may receive instruction, be assigned a problem and receive the degree of Master. His thesis may be on oral surgery, or a similar subject. It seems to me we have these two distinct things to discuss. As Dr. Moorehead has said, graduate study is taken care of in the universities, we have nothing to do with it. In Minnesota, it is in the graduate school that graduate courses are offered in medicine, and the Medical Bulletin refers to the Graduate School Bulletin. There, it seems to me, is our future also. And the graduate school must be in charge of the graduate degree.

To illustrate: We had a student present himself who had had four years of under-graduate work. That is prerequisite. And he had covered the ground in elementary biology. His topic was "The

Bacteria of the Mouth." He said: "What must I do to qualify for the degree of Master of Science? My thesis will be on the bacteriology of the mouth." In the first place he was to take an advanced course in biology. In the next place he had had only an introductory course in bacteriology. He was to work in the clinic as much as was necessary to secure his bacteria, and grow his cultures in the laboratory. Now, if his thesis is of the nature that is necessary for the Master's degree, he will get his degree, and not otherwise. He confines himself to practical biologic study.

Taking this illustration in connection with the illustration given by the President, we would have to modify greatly the number of hours that Dr. Biddle recommends that we devote to a variety of so-called graduate subjects.

As to the degree itself, I think now is the time when we should discuss the abolition of the Doctor's degree in dental surgery, substituting the Bachelor's degree in dental surgery, to be given at the end of four years. At the end of the fifth year we should give the Master's degree in dental surgery, and then at the end of two or more years of study we could give the Doctor's degree in science. The problem assigned in securing this degree would be infinitely more difficult that that assigned for the Master's degree. After the student had the Bachelor's degree he would be assigned work in bacteriology in its different subdivisions, and work in the infirmary as well. In obtaining the Master's degree, for instance, in Orthodontia, he might write a thesis on the etiology of irregularities, referring to certain conditions favoring irregularity. But in writing his thesis for the Doctor's degree he would make it a world study. He would not only study his subject from the world standpoint, but embody in it his concept of economic and social conditions the world over. Therefore he would present a thesis which would have the characteristics of a doctor's work.

Now, whether we want to or not we are going to have this question forced upon us. That is the challenge of the present moment. The President referred to the glories of the past, and, of course, I do not want to say anything against that; but I should rather accept the history of the past as a perpetual challenge for something better.

Dr. Black discussed two types of graduate courses. It seems to me that they are one type offered in a different way—the same graduate problem, which he wants in one year, or in two years, or in more or less time; it does not make any difference as long as the requirements are met.

I agree with Dr. Moorehead in regard to war dentistry. That is another one of the great challenges.

H. L. Wheeler, New York City.

I would like to say a word or two upon a subject that was not touched upon, but which should be covered. Mention was made of the necessity of those dental students who will enter the service of the Army, especially to practice Oral Surgery, going into departments of medical schools to obtain some of their knowledge. It seems to me that it is also necessary that the medical men practicing in the Army should have an opportunity to take a course in the dental schools. Some have done that, and in New York Professor Carr has given to a large number of medical men in the Navy, sent there by authority of the Surgeon General of the United States Navy, a short course in minor surgery of the mouth. It is as essential on one side as on the other. And I would like to suggest that in these courses the necessity of the young surgeon in the Army and Navy having to do minor surgery in the mouth be considered, and that they be given an opportunity to enter the dental schools to take these courses.

Henry W. Gillett, New York City.

I thank the Chairman for the opportunity of introducing myself to this body. I have been much interested in the President's address and in the comments it has brought out. Being, as many of you know, actively interested in an effort to establish courses in New York for graduate dentists, courses of a type that shall attract men who come for real instruction, we are endeavoring to so arrange those courses as to meet the varied demands of men who have been in practice as a rule for several years. In the inception of our work it was suggested that we should limit our admittance to men who had at least five years of practice. The rules of the Regents of New York State made this seem unwise but we were finding it desirable to discourage men from entering who have not been in practice long enough to place them in a position to grasp the type of instruction that we present. Our courses for graduates have been aimed at providing opportunity for broadening the knowledge of men who have had inadequate instruction as under-graduates, or inadequate experience by reason of location subsequent to graduation and who consequently feel the need for instruction in advanced method. Therefore our courses have been aimed at giving those men an opportunity to select instruction along the lines that they desired. It may be of interest to you to know that our experience indicated an overwhelming demand for that type of instruction.

We have endeavored to put in practice the plan mentioned by Professor Black, namely: The arrangement of courses so as to offer men from a distance opportunity for intensive study for comparatively short periods so that they may be constantly busy during their stay. We have arranged other courses so that similar instruction is offered at other times to local men for from one to three days a week, thus spreading the course over longer periods.

Otto U. King, Secretary-Editor, National Dental Association, Chicago, Illinois.

I assure you that it gives me great pleasure to have this opportunity to speak before this organization, for the American Institute of Dental Teachers is the dental profession's grand alma mater. Dr. Biddle, our president, has focussed our attention on one of the livest subjects before the dental profession today. This organization, as well as Dr. Biddle, is to be congratulated on the practical outline that he has presented—making it possible for us to carry out this work in the curricula of the dental colleges.

One thing that I desire to impress on each man, who may be connected with dental college work, is the fact that there is a tremendous responsibility resting upon all dental schools of this country, namely, the carrying into practical effect some sort of post-graduate school work. In my official connections with the National Dental Association, I notice an increasing demand, which has permeated the entire dental profession for higher educational attainment. Local and state dental societies, as well as small groups of men, thruout the length and breadth of this country, are endeavoring to meet this crying need by giving post-graduate courses of instruction at their dental meetings. Therefore, at times I have felt that this organization has failed to interpret in a practical way these indications of discontent in our profession and to take advantage of it by giving leadership.

I remember a few years ago when it was a very difficult thing to get men together to hear any sort of a scientific paper on dentistry or allied subjects. Today, the men who attended our conventions listen intently to the reading of the most scientific papers. They sit there just like—well, they just sit there and they stay there until the meeting closes.

And now our exhibitors who come to

our meetings are saying, "we must have a specified time on the program for our exhibits or it will be useless for us to attend the meeting." In other words, formerly we had to use the megaphone and close up the exhibits to get men into a session to listen to the reading of a paper. Now, the tables are turned and our state society program committees find it necessary to give the exhibitors a special place on the program.

Only a year or so ago, in Kansas City, we saw the unusual sight of a thousand dentists attending a one-week post-graduate course. The men taking this course paid a special fee for it and seemed to be perfectly satisfied with the results attained. Many state societies during the last two years have inaugurated special post-graduate courses and several have already been announced for this year. Therefore, I again repeat that there is a tremendous responsibility resting upon this organization for the outlining and carrying into effect, in every dental college in this country some sort of a special post-graduate course. For I contend that the dental instructors and the dental college should be the leaders in this educational movement. I am wondering if our dental schools are going to miss this opportunity of leading our profession to a higher status of educational and professional attainment?

Dr. Owre: The question was brought up as to who should offer these courses, extension as well as graduate courses, but particularly the latter. These should be left within university, which should take advantage of practitioners who have reached a high degree of specialization in the various fields. In that way they could organize their material and become stabilized by the university. The best illustration of that, of course, is the Mayo Clinic, which virtually offers all the graduate work in medicine, outside of the sciences, in Minnesota. It is along such lines that we must evolve until the time comes when we can actually have all these men for state institutions.

Dr. Gillett: Dr. Biddle's schedule prompts me to say that it appealed to us at Columbia, in establishing courses for graduate dentists there, that the real need was for something different than it had been possible to offer in so-called post-graduate work of the societies, which were largely lecture and demonstration courses. We have had a good deal of experience with courses of that kind in New York and thruout the East and have found a demand for something different. We found a considerable part of the profession becoming satiated with that type of instruction and asking opportunity to do practical work under the eye of competent instructors. For this work we have provided very perfect equipment and demand earnest work of every practitioner who enrolls. We accept only such members as can work advantageously.

Dr. Biddle: I am greatly pleased with the discussion which my paper has brought forth. With reference to Dr. Hillyer's remark concerning a minimum schedule, would say that the schedule of hours I had in mind is not even a minimum schedule, merely a suggestion, for I think it would be presumptuous for any one member to furnish this organization with a complete schedule. If a committee were appointed to evolve a plan it should be submitted to this institution, only after consultation with various heads of departments of schools of this membership. While I have not furnished a minimum schedule, I had figured upon 1344 hours, a little more than is included in the schedule suggested by Dr. Hillyer. Orthodontia was purposely omitted from my list under graduate work inasmuch as I deemed it best taken care of in a separate course under Post-Graduate Courses. Operative and Prosthetic Dentistry, Crown and Bridge Work were not

allotted as much time as one of the discussers suggested, inasmuch as they are exhaustively considered in regular courses.

Dr. Owre says that eight schools are giving graduate instruction. Upon investigation, he will find that this is post-graduate work and in many instances, sporatic at best. In fact, there are but three schools giving regular, systematic, post-graduate courses. So far, investigations show that there is but one school giving graduate work with its accompanying degree at the end of the year. Regarding the time spent in graduate work, the writer does not mean to infer that all such work could be done in one year in evening classes, but that it may be done in day or evening classes extending thru one year or a number of years, as best suited to the needs of the various schools.

I cannot agree with Dr. Moorehead that graduate courses are in the future and need not be seriously considered at this time. As the writer stated previously, one school has already inaugurated such a course and awards a graduate degree and within the near future, three other schools at least contemplate similar action, each planning to confer a different degree for practically the same amount of time and work. Therefore, I am of the opinion that the time has now arrived for some systematic, standardized graduate course to be developed by this teaching body to the mutual advantage both of this body and of the profession.

For a number of years, graduate and post-graduate work has been discussed at our annual meetings. This year the president's address was prepared with the one purpose in mind, that it might be the humble beginning of an earnest effort to outline a course, which with minor modifications for individual cases might be adopted by any school desirous of considering advanced work in dentistry, so much in demand by many members of our profession.

I thank the members of the Institute, and especially the discussers of my address for their kindly consideration.

THE VALUE OF THE DENTAL LIBRARY AND MUSEUM TO THE TEACHING OF DENTISTRY.

By Nelville S. Hoff, D. D. S., Ann Arbor.

The Library.

IN PRESENTING this subject for discussion, it seems desirable to make some classification as to material resources that we may make such distinctions as to the relative importance of each class as shall place the matter logically in our minds. And for lack of any precedent, we would suggest the following order of consideration:

1. Historic Literature.
2. Scientific Research.
3. Published Books.
4. Current Literature.

Historic Literature.

Under this title we would include all literature pertaining to dentistry that more or less directly sets forth the development of dentistry from its crudest forms to its present practicable usefulness and professional standing. We are fortunate in having creditable records except perhaps of the earliest ages when nothing of scientific consequence was produced and even the art was so elemental and chaotic as to have little value of a pedagogic character. The writings of Guerini and Koch furnish us all the dependable history necessary for presenting the essentials of dental activities up to the time of the publication of these works, and our current magazine literature, where available, supplies necessary details for special readings or class presentations.

Few students have the necessary training to make good use of libraries without special direction. They lack incentive and because of inexperience cannot read with proper discrimination. For this reason it would seem that the only way this material can be made available to students is to present it in the form of a lecture course that is didatic in form, with citations and expositions that will enable such students as may care to make further personal research to find the material necessary without too great effort. It is curious to notice how students will become interested in particular subjects and want to know more about some particular phase of the subject. Whatever may be the reason, the instructor should be ready to direct such a student to the sources of information which may not only satisfy his curiosity, but which may also give him a keener desire to know more of the whole subject. He is almost sure to be led into collateral readings by this means, that tend to widen his knowledge and stimulate his intellect. This will, of course, necessitate access to the literature involved; and means that every college should have in its building as complete a file of dental literature as possible, that opportunities for developing literary inclinations may be quickly apprehended. It may happen that the instructor is not always able to cite references that will satisfy a student's desire for conclusive statements on his matters of inquiry; but this very fact may be the best chance for inciting a student to dig up the information for himself if he can be directed to the best records available. If this is not done, there will be little stimulation of the imagination and no intellectual interest in even the most exact matters.

It is obvious that the lecture course, or text book, on any subject must discuss that particular topic only in its essentials with no intention of exhausting it, or of making a complete exposition of it. Lec-

tures so elaborated would be tedious and uninteresting, and little enthusiasm would be generated even by the most scholarly instructor. In dental history, for instance, it would require all our printed literature, and more perhaps, to exhaust the subject, and very few persons would care to spend so much time on it; but it is necessary that we have access to *all* of this literature that we may have correct information about some particular part in which we may be most interested. Therefore we cannot see how any properly equipped dental college can exist without a complete file of our dental journals, even tho it may not be generally consulted by the student body. Neither can we conceive of a progressive teaching staff which cannot have access to a complete dental library.

If there is a fundamental starting point for the development of an intelligent and progressive professional dentist, it certainly must be found in the history of the development of the profession, such as can only be found in the profession's literature. It therefore seems necessary that our libraries shall not only be as complete as is practicable, that our students may become acquainted with the vitalizing traditions of the profession, but that we may start new impulses for making our profession more learned as well as more useful.

If it were practicable to trace back to its original source every accomplishment made by our profession, we have little doubt that somewhere in our literature will be discovered the *seed thought* which is responsible for every discovery or invention that we so proudly claim as original. We should, for instance, need to go back of Horace Wells to Priestly to find the starting point to one of the world's greatest treasures. The study of the history and the ultimate benefits of practical anesthesia makes for culture, and it is all recorded in our books. We must have such history available to students and they must at least know it in outline, and it will be still better if they can know it in more detail than it is practicable for the usual lecture course to present it.

Dental Scientists and their Work.

What we have said above in regard to our history and its usefulness in developing professional *esprit de Corps* may, with perhaps more justice, be cited as a reason for a literary record of the lives of the men who have produced our scientific knowledge and our technical discoveries. We are also indebted to the men who have done so much to develop our calling into a respected and honored profession. It may seem sentimental to hold up the lives and works of these men and to commend the records of their lives and works to students with the idea of making these students more efficient dentists. But what better methods have we for inspiring our students with proper professional ideals than to point out the work and character of some of the men who have given us our place in the world as learned and skilled servants of humanity?

One of the most widely known and highly esteemed men in our profession once said that he left his home in a distant country and located for practice in a large city of this country that he might be near to the men about whom he was reading in the dental journals. He said he wanted to know them personally. His faithfulness to this leading resulted in his becoming not only an honored teacher in a dental college, but one of the most useful practitioners of his art, and a writer of distinction and force. What dental student can read the works of G. V. Black and W. D. Miller, and know of the heroic sacrifices of these men for the cause of dental health, and not be inspired with a hope to one day make some worthy contribution to the calling which he has espoused? While it is true the lives and characters of such men are portrayed in the students' text books, and they are the common knowledge of our

instructors, who recognize their work by proper references and citations in the class room, let us hope their personal biographies may some day be put into permanent and accessible form for dental students of all time.

The knowledge that such men have helped us to accumulate we have on file in our literature, and it is highly important that it should be accessible to every earnest student. While it is true that the essential matters are kept alive by our class text books, it is usually in the abbreviated form and is not always kept associated in the personal relation that serves as "the touch of the vanished hand" to vitalize and inspire to a like consecration and achievement.

It is unnecessary to catalog all the men who have helped to build our literature, or perhaps to make more extended comment on the enormous influence their writings may have had, or may yet exert in the future development of our professional life; but we feel that a knowledge of this literature and the opportunity to freely consult it should help to quicken immensely our present professional activities, and be one of the great forces for stimulating personal development on the part of dental students.

Reference and Text Books.

It is the general custom in most schools to require students to buy all text books used in the course, and so far as they are willing, to urge the purchase of other books on the various allied subjects. In some instances the owning of a text book is made the requirement for admission to the classes. I will not take your time here to discuss the abuses or rather the prevalent neglect on the part of the students in individual ownership of competent text books on all subjects. It is a somewhat vital subject, as no student can do himself or his instructor justice who does not possess and study his text book along with his course. In some subjects there are several books to choose from, and it can hardly be expected that all approved text books on every subject of the curriculum will be in the possession of all the students. It therefore becomes necessary for the college library to have a sufficient number of reference books not required in the course in its reading rooms that students may look up citations by the instructor. These books should be available at such hours as students may have time to consult them. This involves a sufficient number of such books as to make it possible for students to either withdraw them for home reading, or the constant attendance of the librarian and an open reading room. Perhaps the open reading room at stated hours with an attendant will meet most situations better than the loan plan; because by the loan system books are badly used up and are often lost entirely. In spite of the expense involved, we believe it would add enough to the general advancement in scholarship, to justify the expense of providing students with every possible facility for access to this literaturue.

Current Literature.

Included under this heading would be the periodical magazines and other occasional contributions that cannot be classified as books. It is the custom of most colleges to display in the college reading room, copies of the monthly dental journals, but in very few colleges, so far as we know, is there any definite plan of calling the students' attention to special articles, or to a systematic reading of the journals. There is nothing that could be done to promote the reading of our current literature so much as the organizing of a course of systematic journal reading under the direction of a competent instructor. It would establish a helpful habit for the future and it would create a live interest in the studies especially of the upper class men.

It is a well known fact that dentists do not read their current literature adequately or in the best way to get the most out of the time devoted to its reading,

and the lack of proper training in college is no doubt much to blame for this.

It would not be an expensive matter to have on the tables of the college reading room several copies of all the journals published. In fact, the publishers would be glad to make liberal concessions if assured that their journals were to be made useful in the development of literary habits. Students ought to be shown how to read with discrimination, and also to record for future reference articles that may be helpful for consultation in writing papers for dental societies and for use in research, or that may be utilized in practice.

In dental college libraries, and in occasional private libraries, sets of journals are saved and bound, but as a rule few private practitioners care to bind more than one or two journals. It is possible, however, to preserve by some such means as a card index or letter file case, articles taken from magazines, which may be classified in the file so that they are easily and quickly found when wanted. A student can be shown how to preserve his readings so that he will not only take pride in his collection, but he will become a discriminating collector as well as have the statisfaction of being known as a well posted and intelligent professional man, and all because he has learned to read and collect only those things having scientific and professional values.

The Museum.

In considering the museum as an educational factor we should think of it as a collection which shall serve the purpose of recording facts that illustrate and have influenced in some way the development of our science and art. It should contain exhibits primarily that serve to illustrate the typical and normal. The abnormal and atypical where they illustrate frequent deviations, especially when the causes can be prevented by remedial agencies, are also important. Just how far effort is justified in the collection and exhibition of the monstrous in pathology, or the errors of the practitioner in technical treatment, we shall have to decide on the basis of individual merit as to its helpfulness as illustrative material.

A museum showing only the anatomically perfect specimens may not be so interesting because of its monotony of perfection; and on the other hand, remarkable contrasts such as are exhibited in extreme deformities attract attention and accentuate the ideally normal.

The interest of the average student in dental museums is claimed by the exhibits of the peculiar or monstrous, and it may be wise to cater to this taste in order that exhibits of greater significance may be brought to his notice.

Dental museums ordinarily seem to be the result of chance, or to express the individuality of an enthusiastic member of the faculty for a particular subject. It is therefore difficult to outline a classification except on a theoretical basis, which no considerable number of teachers would probably accept. For the purpose of this discussion we would classify the dental museum that shall have an instructive value for students in accordance with the following scheme.

1. History and Curios.
2. Anatomy and Pathology.
3. Illustrative Material for Class Purposes.
4. Collateral Science and Art.
5. Technical Material.

History and Curios.

Historic material of dental concern may be of great variety and limitless almost in quantity. Pictures of the founders and promoters of our science and art can be of great value, especially if accompanied with adequate explanatory information. The ideals and works of our great men ought to be held up to our students, who some day will do great things perhaps, if the right incentive appeals to them. As we value mostly the

records of our great men, why not keep their works perpetually before our students? A picture gallery would attract and might inspire some young men to higher ambitions. The books such men have contributed to the cause, and their casual contributions which may have served to develop some technical principle or scientific fact of more or less value, if attractively exhibited should contribute to the general culture of students coming under such influences. Pictures, books and other illustrations of these men of character are obtainable to a limited extent, and reproductions in lantern slides or reprints could be had of the more rare specimens, provided any interest in this direction were developed and the need were demonstrated.

Curios of Literature and Art also have a definite value, and the variety and quantity of such material that can be accumulated by persistent effort is surprising. Every dentist who has been in practice for a number of years will have accumulated something of great interest as a curio if not of considerable historic interest. Books, literary articles, instruments and appliances, incidents of practice, and other data of historic interest should, to a limited extent, form a part of every college collection not only for the sake of preserving as complete a record of our profession as is possible, but also that these matters may serve to give students a broader view of the dental field of achievement. If such material is wisely collected and displayed, it will be an educational factor of definite, tho perhaps, not of ostensible consequence.

If this historic material is used by the teaching faculty in illustration of class work, as it can very well be used occasionally, it may be made of much greater value than when it is simply displayed in a glass covered case.

Anatomic and Pathologic Exhibits.

As anatomy is the fundamental science on which our knowledge of the human body in health and disease is based, it would seem that every possible help to a complete understanding of that part of the human body in which the dental student is particularly interested should be made available. We take it for granted that the necessity for a collection of human crania in the possession of every school is evident whether any attempt to have a complete museum is made or not.

We should include under the head of anatomy, all the biologic studies, such as physiology, histology, etc. A complete anatomic museum of the human head and face may not be within the reach of many dental colleges, but every college museum can and should have a display of human crania and teeth with the muscles and the nerve supply. Such, for instance, as the jaws and teeth with muscles, nerve and blood supplies. To this can, and should be added, when practicable, a complete exhibit of the developing teeth from the pre-natal to the senile period of life. Sets of these preparations are available at moderate cost, and they are of exceptional value for class room purposes as well as museum specimens. Lantern slides and pictures are also procurable at much less expense and are fairly good substitutes for the actual specimens. Charts and drawings are sometimes used, but as a rule they are not interesting unless displayed in an attractive manner.

In dental anatomy there is a great opportunity for displaying specimens of teeth in the different stages of development with their environments. These may be shown by prepared specimens of typically normal conditions. Specimens showing the teeth in typically normal developed arches, with normal occlusion and articulation, should be shown in special exhibits apart from malformed teeth and arches. In another exhibit a similar exhibit may be made of the most usual malformations to bring out the

normal in type by contrast with the abnormal. A great many colleges have exhibits of these specimens, but so heterogeneously arranged that they have little value as material for instruction. As dental anatomy is one of the most important subjects taught in colleges, it can hardly be overdone, except that sometimes the mistake is made of confining it almost entirely to the study of surface form of whatever extracted teeth may be available rather than of selected typical teeth.

It is possible to accumulate a complete collection of teeth showing typical as well as the usual abnormal forms. These, if properly mounted and arranged will be most convincing and they can be photographed and shown enlarged by lantern slides to larger classes when desirable.

Cut sections of typical teeth, both longitudinal and transverse, properly mounted and labeled, are shown in normal order of position in the arches and will make a useful and desirable illustration of the internal structure of each tooth. Such specimens are procurable and should have an important place in every dental museum.

Of less value perhaps, but of great interest, is a collection of malformed teeth and of casts showing the teeth in malposition. The malformed teeth can be mounted in such a way as to permit of identification by suitable labels, and of inspection of every surface. The number of such specimens need not be limited, but the collection would be more valuable if some system of classification that will bring out most distinctly to the student's eye and mind the lesson each group or individual tooth is intended to show.

In comparative anatomy there is an extensive opportunity to impart most valuable information by an exhibition of only a few well selected specimens which show the modification of teeth in nature to meet the various environments and food habits of the different classes of wild and domestic animals.

It is a most difficult matter to impart to the average student the functions of human teeth without reference to the forms of teeth in various animals as compared to man. It is so much easier to teach not only the anatomy, but the nomenclature of the human dentition by comparison with the anatomy and function of animal teeth, that it is almost essential that a course in comparative odontology should accompany the course in human dental anatomy. The instruction in comparative anatomy is greatly facilitated by a wisely selected collection of animal crania, or by good lantern slides or charts of the same. Where the masticating functions are highly specialized, the anatomical forms are greatly accentuated to meet this condition, and it is easy to make plain the comparative functions of similar organs in man, where the organs and their functions are not so well defined. Therefore, a museum of comparative odontology or its equivalent should be an important item in every dental museum.

Pathologic specimens are always interesting as curios and the tendency is generally to exaggerate in this direction, because such specimens are plentiful. Every one saves the curious and the unusual specimens, and many times the histories make these specimens of great value for the bearing they have on diagnosis and therapeutic treatment. There is usually a temptation to overload museums with this class of material which it is difficult to classify or make valuable as teaching specimens. It takes up valuable space and for exhibit purposes it requires careful labeling to give it instruction value. It is more valuable in the hands of the teacher, as he can point out the direct as well as the related bearings on disease and its treatment. An extensive collection of exostosed roots, pulp nodules, or bifurcated single rooted teeth are not necessary to demonstrate the frequency of these conditions, while

perhaps a large collection of impacted third molars might be better justified because of the variety of technical procedures needed for their removal.

Whether these collections are small or extensive, they are not valuable in the teaching process unless they are properly classified and displayed with legible labels. Incidentally we would observe that this mounted labeling is an art by itself and should be done by one who not only has a knowledge of all the values of the specimen, but has had experience in making effective this phase of the museum. We can learn much here from the taxidermist.

Microscopic slides of developing teeth and jaws enlarged and colored, and made up as transparencies, may be exhibited in cases with electric light illumination to show specimens of the normal as well as pathologic conditions. Such material is usually in the form of microscopic slides and consequently not available for the student. This form of showing such specimens is better than the preservation of them by the old method of exhibiting them in glass jars, altho there are certain preparations that cannot be exhibited in any other way. While these preparations are largely used by class instructors and are not usually considered museum material, there is here a chance to enforce the class room and laboratory instruction very decidedly and at the same time make the museum a more vital influence than it is ordinarily. Special exhibits of this kind can be made at such times as the classes are engaged with the subjects exhibited. This may be readily done by having suitable cases in which the material can be changed when needed. If properly taken care of, such exhibits may become centers of continual interest and thus justify their preparation.

Illustrative Material for Class Work.

One of the best methods of enforcing class instruction is by means of drawings, charts and samples of technical construction. Very often there is little time during the class hour to study specimens shown and while not all students would take the trouble to more carefully study such illustrations when put on exhibition, a considerable number would if the exhibits are made so popular as to cause talk among the students. Of course all class material could not be profitably used in this way. By mixing technical and scientific with other educative material in succession a live interest would be generated in the museum exhibits, and a new incentive would be created for individual thinking, reading, and perhaps in investigation. One of the most serious criticisms that has been made on much of our teaching is that students are not trained to think for themselves, may it not be that we are to blame for this because we enforce the system of memorizing unduly, and at the expense of stimulating the imagination by appealing to other senses. There is no other sense that makes a stronger appeal to the intelligence than sight and we may cultivate it to very good purpose by such exhibitions.

Exhibits of Collateral Objects.

Just how far we are justified in giving space to curios and museum specimens that have little or no relation to dentistry, it may be difficult to say. Should it be permissable, for instance to exhibit the taxidermic specimen of the hen or the turtle to illustrate a form of jaw that has a kind of masticating function and yet no well defined tooth organ? Or how far are we justified in giving space to the stuffed birds and animals even tho they enable us to a clearer understanding of the food habits of such animals? All such specimens have educational values, but they require space for proper display and may divert attention from the more desirable and essential features of dental instruction. There is ample justification for exhibits of the human skeleton or its various bones even

to the bones of the hands and feet, altho they have no immediate relation to dental functions of any kind. There are also good reasons for including specimens of normal as well as some pathologic tissues of the head, thorax and abdomen, as these are closely related to dental functions, as their anatomic and physiologic form in health and disease is a matter of considerable importance to the dentist. Specimens or pictures of tumors, benign and malignant, especially about the head and face, may very properly have a place in a dental museum. The extent to which museum material of this sort may be desirable will of course depend on the size of the collection or the character of the instruction attempted in individual schools, and the opportunities for adequately displaying it or making it accessible to students. This kind of material deteriorates more rapidly than the hard tissues and it requires periodic attention or renewal and it may be questionable whether it should be attempted except in a small way.

Technical Material.

The great variety of available and useful technical material make this perhaps one of the most important classes of instructional exhibits. It may be divided into two sections for classification; the *Historic* and *Modern*.

Historic Technic. Owing to the fact there has been preserved much technical material, it is not difficult to secure collections of this class of material that are not only attractive, but that have positive educational values. Such material has been used often to show priority of invention or use of technical procedures. While the temptation here is to display this material in excess of a proper classification, confusion and little advantage often results from such collections. It is possible by judicious selection, to make such a collection as shall give a chronological history of technical procedures from the earliest technical dentistry to the present time, the value of which is so obvious as to need no further comment. A miscellaneous collection of even very good specimens of technical art not properly displayed and labeled has very small instructional value. There is no more reason for making a miscellaneous display of historic technics than for collecting our magazine literature in a miscellaneous form. A file of dental journals that is not complete and properly bound and indexed is not accessible or valuable. A collection of dental technical processes or facilities that is not orderly arranged is not as valuable or comprehensible as when it is properly and orderly arranged, labeled and adequately described. It may be true that a large number of old fashioned pearl handled instruments with gold and jeweled mountings displayed in a beautiful mahogany case will attract attention and have an educational value, but two or three cases of such materials serve no good purpose, no more than innumerable duplications of the same instrument, however interesting the instrument or the period and practice it represents.

It would be interesting and valuable to have a historic collection of gold foil pluggers, but a complete set of all the different sets of foil pluggers that have been used from the beginning to now would cost quite a sum and take lots of space, and after all be of no great value as a teaching factor. A much smaller display properly classified and described would be much more instructive. This statement may be applied to all other instruments and dental equipment. We have seen at least half a hundred differently made turn-keys, each one interesting in itself, but two or three would illustrate all the essentials necessary to a faithful representation of this class of instruments and their uses.

It would seem that a more orderly and adequate presentation of technical exhibits would be to make a chronologic exhibit of each class of instruments rather than to attempt to show all the instruments of the different periods of techni-

cal progress or activity. In harmony with this idea it would be consistent to make an exhibit of the development of any process of a technical character showing the development of the instruments and technic. The development of the porcelain and gold inlay technic could be exhibited in its essential features, but it might be more difficult to present such subjects as oral prophylaxis, conductive anesthesia, or root canal treatment and filling. The aim should be always to present each article or subject in a comprehensive form but at the same time it should be as free as possible from confusion with other and related objects or subjects. In short, a museum, especially of technical objects, should be an exhibit of all that is known of any subject that may serve to picture our knowledge of the technical art of dentistry.

Most dental colleges have more or less of this material on display in the technical laboratories or class rooms, but it is usually not accessible to students for study and is not so arranged that it pictures the subjects in a scientific form. Most modern forms of technical procedure can be placed on exhibition where the student has free access to view and study at his leisure and to his entire satisfaction. By such exhibits attractively displayed, a much better conception of right methods can be given to some students than any word pictures by the average instructor, especially since few of us possess the rare qualification of eloquent and picturesque portrayal.

Our vision therefore of the dental museum is one that is not a mere junk-shop, or a haphazard collection of every conceivable article of near or remote interest to dental science or art, but a scientifically classified exhibit of such articles as may be classified or grouped to more clearly show what we now know about the correct practice of the art of dentistry; and it may serve to enlarge our knowledge and intelligence of the subject, to exhibit the various steps which have been taken to lead us up from the crudest beginnings to our present ideals and practices.

Acquiring Museum Material.

The question which naturally arises in the mind of every one who contemplates the realization of such a vision, is, how is it possible for all our colleges to accumulate so much material as would be required to make even a moderate accomplishment on such a basis. The expense of collecting and mounting for exhibition purposes and its housing and adequate care would seem impracticable even if the material were to be had, much of which would not be at all available for all our fifty or more dental colleges.

We should not expect that every school would have the means or inclination to make the investment required. Nevertheless, it can, and should, be demonstrated that this feature of instruction is of sufficient importance to justify its cost. Some colleges that are in sympathy with this idea should complete the ideal dental museums. However, we fully believe that it is practicable for every dental college to qualify along this line in a very much larger degree than at present prevails. And further, many colleges have at the present time enough material to make a fairly respectable beginning, which will grow sooner than they think into one of their most important factors. The one great advantage of this kind of instruction is that it makes its appeal to all kinds of students and by the most natural and effective pedagogic method. When once installed, it increases almost automatically and is not a great expense burden. It is never cranky or troublesome, and does not resign, or be continually demanding a salary or grade advance. It receives all proper advances graciously, does all the teaching it can with a consistency and persistence that no other member of the faculty attempts to imitate. It furnishes material for illustrating every subject in

the dental curriculum, if adequately equipped. It conserves the time needed for didactic instruction and is therefore economical in the highest sense. The time and expense therefore necessary for its procurement should not interfere with its realization in a larger degree than at present obtains in most dental colleges.

If this ideal should ever become popular in our dental colleges and the systematic collection of material were earnestly begun, we are confident the alumni of the various colleges would send in the needed material for this purpose as fast as it could be mounted and displayed. Besides this, the more colleges that take up with this idea, the more likely duplicates will accumulate that may be exchanged with other museums for specimens that may be needed to complete special collections, which may be difficult to obtain otherwise.

A museum cannot be bought—it must be created. It will take time, and perhaps it may never be entirely completed; but we have all the accumulations of the past and we shall have all the future in which to save and create. If there are not enough of the rare and needed specimens to supply all our museums, there need be no missing links in any displays, as we can use picture illustrations, or we can manufacture duplicates if necessary. There is nothing impossible except perhaps our lack of desire for a satisfactory realization of this vision.

Housing and Care of the Library and Museum.

If a room is set apart for a library, museum and reading room, it must be of ample proportions and properly fitted for this purpose. Of course all the fixtures for future needs may not be provided but enough to show that it is intended to be a permanent and important feature of instruction. If this is done, and someone who is interested to the extent of a good degree of enthusiasm is put in charge, it will be an agreeable surprise how rapidly material will begin to come in. Often too, from unexpected and possibly disinterested persons contributions will come, all of which of course may not be useful, but enough additions will be made each year to soon make the library and museum a permanent fixture. Occasional opportunities for purchase and exchanges with other libraries and museums will soon add enough valuable material to make it possible to use the library and museum as a direct means of imparting instruction. If it is not practicable to purchase, create or secure contributions of the more rare specimens, it is possible many times to secure photographs, or lantern slides, models, or even descriptions of rare things that would help to make this feature a place where things may not only be seen and examined, but a place where information about rare articles in other museums and libraries may be found. Catalogs of all museums might to good advantage be made with full descriptions of unusually rare treasures. Such material would often be useful for instruction purposes and as a help in securing data for literary and scientific research. In connection with such a catalog, a most helpful plan of clipping and filing the important articles published in the current periodicals, with double card index reference cards of the titles and authors would classify and make easily available all magazine and casual publications. This of course would necessitate a library attendant who was capable of keeping such a system up to date and in proper order. But any library or museum which does not have such an officer cannot serve adequately, and to the extent it is lacking in this respect it is relatively inefficient.

A library and museum that is suitable for the needs of the dental college as it is organized today must be kept up to date in material and sources of information on every subject that is taught in the curriculum. It is asking more from teachers than they are ordinarily able to do, to expect them to provide material

for illustrating their lectures and class work; and because the courses in practical dentistry are so nearly related, it is impracticable for most teachers to provide such libraries as are required to keep up with the progress of their own subjects. The loss to the college in the quality of instruction by lack of proper illustrative material or inadequate preparation by its teachers would be immeasurably greater than the actual financial outlay needed to provide this helpful material and making it available to both teachers and students.

The finest collection of museum and library material in existence will be of comparatively small value, unless it is utilized to the best advantage. And of equal importance with the material possessions is the officer whose business it is to see to it that every teacher is kept posted as to new accessories that may be used advantageously in his courses of instruction. Of little value would be a hundred microscopes, or a thousand lantern slides if no teacher ever used them, and the students only knew from the college catalog that they were housed in the museum somewhere.

A library and a museum go out of style periodically, as well as fads in education; and unless some one intelligent enough to keep posted as to the latest things in literature and exhibits of technical art, is in charge of a museum and library, the dust and cobwebs will accumulate in the intellects of the instructors, and the enthusiasm in the class room dies down to an uninteresting performance, and education becomes forced and perfunctory, except in spots where there happens to be a live wire on the rostrum.

My plea is for as good a library and museum in every dental college as it is practicable to secure; and that it be kept as nearly as practicable up to date in every department; and that a capable custodian shall have charge of it; and also that every instructor shall have enough interest in his department of the museum to keep it up to date; and finally, that every instructor shall make the most use of it that is possible for the benefit of his students and the generation of a universal attitude of inquiry and learning in the college.

Discussion.

Dr. Arthur D. Black, Chicago.

Dr. Hoff has presented one of the most important papers that has come before this Institute in many years. We have reached the time when, with the introduction of the four-year course, we should pay more attention to things which are not only of great assistance in our routine instruction in the various departments, but also of tremendous cultural value. The library and museum of an institution should be the hub around which practically all the activities of that institution should revolve. There should be a teaching connection between the library and museum, and every department of the institution. The library should be the place where the student will be attracted when he has no other definite assignment. It should be made so attractive that he will naturally drift there when he has leisure time.

The better classification and more intensive use of our dental literature in the school should develop a closer relationship between the dental student and the practitioner. We have not as a rule brought the student up to as definite a realization as we should of what he is going to meet and be up against when he gets out in practice. We have generally taught him one thing along one line. We have not given him the broader view. Our curriculum should be so planned that our senior students should do much of the thesis work. At stated intervals each student should present a brief theme or thesis covering a certain number of articles assigned to him. This should be read before the class, or a section of it, and discussed by other students.

The museum collection should not be in a room where we have to unlock the door when we take the student in to show it to him. It should be wide open and inviting. The collection should not be entirely confined to a stated room. In the operative technic room there should be an exhibit of the selected work of students for a number of years. In the prosthetic technic room, there should be a similar exhibit, many photomicrographs should be on exhibition in the histologic, pathologic and bacteriologic laboratories, etc. Every department should have exhibits which will create interest and help to instruct. We have a mouth hygiene exhibit showing the history and development of various forms of tooth-brushes, also the steps in their manufacture. Another exhibit is of scalers used for removing culculus, from the time when it required a large chisel and mallet down to the smaller and smaller scalers that have been employed thru the years. The gradual reduction in the sizes of scalers is an indication of the progress that has been made in teaching mouth hygiene. As people have taken better care of their teeth, the large scalers have fallen into disuse, because they were not needed.

Dr. Hoff referred to the value of keeping alive in our schools the memory of the work and of the men who have gone before us. I do not know whether they have it or not, but it would be fine if the Baltimore College of Dental Surgery had an exhibit commemorating the life and work of Harris and Hayden. Every school ought to have a collection representing the work of those men who were the pioneers in dentistry, and each individual school should have a collection for the men who helped to make for it a place in the sun. In our own institution, some time ago, one of the graduating classes presented the school with a bust of my father. The Alumni Association has decided to present, in June of this year, a bust of Dr. Koch. Our students and alumni are glad to do these things.

Dr. H. E. Friesell, Pittsburgh.

I want to take this opportunity to compliment Dr. Hoff on his paper. It is certainly the best paper dealing with this subject that I have ever had the pleasure of reading or listening to. I also agree with Dr. Black that it is a very appropriate paper at this time. The library and museum have come to be recognized as one of the most important departments of a dental school. Certainly the essayist has given the matter exhaustive treatment and has presented many things in connection with a library and museum that the speaker in particular is glad to learn. At our school we have for twenty years past been attempting to build a library and a museum, and we now have what might be called a potential one. Many of the suggestions that have been made by Dr. Hoff will certainly prove of value to us. We have had in view the ultimate value of this library and museum during all the years we have been attempting to collect material. However, when you visit our school tomorrow afternoon you will not see much of either library or museum. There is, in a small room available for the purpose, just a sample, but we have authorized the construction of a new building which will give us four times the floor space of the present one, and in that building we have provided space for a library and museum 40′x80′. This will indicate what we in Pittsburgh consider a library and museum worth in dental teaching.

We have had the good fortune to be assisted in this work by Dr. Wm.. G. Holland, who is the Curator of the Carnegie Museum in this city. His interest in the work has been of much help to us in building up our library and museum. While you will see only a small portion of our collection, we have probably 300 dry goods boxes full of material and no place at present to put it.

We are praying and hoping that the war will soon end, and when we have our new building we shall be able to make some adequate use of the collection which we have been building up.

The essayist states that a museum cannot be bought. If he can show me where one exists that is for sale I will prove to him that it can be bought.

Dr. Hoff has presented a plan upon which to lay out both of these departments. I agree with him that it is essential to devise some means of training students how to use the library, and I think we will have an excellent opportunity to do this in our course of dental rhetoric or English or whatever the individual school prefers to call it, and also that we can make much use of the library and do much of this training in connection with the course in dental history. Every teacher should give with each lecture or class recitation an assignment of reading to be carried out by the students covering that particular subject, and this might include older work as well as current literature. In this respect, one activity that the Institute has for several years had under consideration will come in very handy in connection with the library and its proper utilization, and that is the Dental Index Bureau. We started on that work about ten years ago and it is getting in pretty good shape, and by the time we in Pittsburgh have our library installed I trust that we may have a Dental Index so that real live use can be made of the library.

I also wish to speak of the value of a collection of anatomical and pathological specimens. This can serve as a very important adjunct to teaching in these departments, and we have been trying to do something of that kind here in Pittsburgh. Proper classification and arrangement of the specimens in a museum is just as important as is possession of the specimens, and I hope that some of us will be able to get in touch with men in the dental profession who are as much interested in this work and as capable of serving in the capacity of librarian and of custodian of a museum, as is Dr. William Bebb, of Northwestern University. Very shortly the modern dental school will be unable to get along without a good library and a good museum, and there will be a place on every dental faculty for a man whose entire time will be devoted to building up the library and museum, and devising means of making them useful to the students and to the teachers.

Dr. E. H. Mauk, San Francisco.

I was particularly interested in what Dr. Hoff had to say about getting the value out of a library, and also what Dr. Black had to say about the plan which we have already put into effect in the University of California Dental School to help bring this about. As a result, I can truly say that for the past two years at least, we have gotten a fuller value out of our library than we were ever able to do before, though the plan I am about to mention has been applied to only one phase of teaching dentistry, the subject of prosthesis.

Recognizing the fact that thruout the course of dental teaching, students became possessed of bits of knowledge which were more or less promiscuous, and in many cases not related in the student's mind, we wanted to devise a means whereby the student might pick up these loose ends. As the University regulations permit of a thesis being accepted in lieu of a final examination, after considerable thought we found that this could be applied very appropriately to stimulating the students use of the library, and give him a broader grasp of the subject than could be obtained thru an examination.

I think we will all admit that the ordinary examination, whether it be a mid-year, an ordinary quiz, or even a final examination, is more or less perfunctory. A student "crams" for it and usually speedily forgets what he has

crammed. Therefore, I feel that the advantages of the plan I will outline here are obvious.

We divided the class into small groups, last year about five in a group, and assigned to each group a thesis topic on which each student must write. This list I will read.

It does not cover all aspects of dental teaching, but bear in mind that this is only one phase of dentistry, dental prosthesis, under which head we include both crown and bridge work and the so-called prosthetic dentistry, or plate denture making.

Subjects were assigned as follows:

Group No. 1. Clasps and special attachments having the function of clasps.

Group No. 2. Bar bridges.

Group No. 3. Inlay abutment bridges.

Group No. 4. Removable facings and teeth.

Group No. 5. Anatomical articulation.

Group No. 6. Compound vs. plaster impressions.

Group No. 7. Rubber and vulcanite, including obturators.

Group No. 8. Dowel crowns.

Group No. 9. Removable bridges.

Group No. 10. Casting, applied to dentistry.

In presenting these theses, the students are required to list all reading references and indicate them by numbers in the body of the text. Subjects were assigned for this year on Dec. 20th, 1917, and are to be presented on March 11th, 1918, the time available for preparation, therefore, being about ten weeks. There is considerable difference between that period of time and what is usually spent in preparation for the ordinary examination, for which one week or less is probably a big average.

The best thesis is selected out of each group, and the writer is required to read it in class, at which time another group of students, previously assigned, discuss it, one at a time, in a formal discussion, criticising freely, or adding new points. Thus no student escapes without preparation on at least two subjects. He is marked not only on the general excellence of his own thesis, but also on his discussion of some other thesis to which he is assigned, and in addition, hears all the other theses read and discussed. From all this he is bound to absorb more than would be possible with a hurried examination and no opportunity for later inspection of the results or comment by others.

Further detail in regard to the manner of presenting the theses would probably not be of value here.

As an aid in their composition, the student is furnished with a list of subtopics with each theme, so that he gets a somewhat defined idea of what he is to write upon. He can select his own material in general, but must at least touch upon these sub-topics.

The interest that has been aroused in Dental Prosthesis in our school since this plan was put into effect is most gratifying. The meetings at which the papers are read are similar to dental society meetings and many of the papers are certainly worthy of being read at any dental society meeting. If a student plagiarizes, this act is usually exposed and critisized by the others. I know of nothing in my sixteen years of teaching that has afforded so much satisfaction as the outcome of this method, and the resultant use of the library. The discussion afford great interest and often provoke great amusement. We also consider these theses a valuable addition to our library, keeping them on file for the guidance of future students.

Dr. Alfred Owre, Minneapolis.

Referring to Dr. Mauk's discussion, we in Minneapolis have used the system outlined for about as many years.

In regard to Dr. Hoff's historic course and the use of the library, I would like to say that there again we are in danger of narrowness unless we associate these special historic events with the general movements of mankind. I know that Dr. Hoff is very fond of giving a course in the history of our men. That is, of course, of great cultural value, but unless it is related to the great historic movements of the world it loses something. For instance, the idealistic value of it is enhanced greatly by references, for instance, to the platonic ideal. That point we should bear in mind. It can be made use of most widely to connect up with a variety of cultural subjects.

Every course in the university, and especially our dental course, should have its reading matter. And that should be assigned to the student as the teacher outlines his course. There should be no excuse for a student not having this material at hand; having been instructed in the use of the library he should have no trouble in finding his data.

We use the term "museum" somewhat in an ambiguous sense also. I think Dr. Hoff has included in the term a great deal of teaching material, technical exhibits, etc. The museum should have in it things of cultural value, the created possessions of the past and present age, things that are really created. To that institution we should relegate such things, and to the exhibit of technical procedure we should have teaching material relegated.

Dr. J. H. Kennerly, St. Louis.

I am always interested in anything that pertains to a dental library. Any library is interesting to me, but as I spend practically all of my leisure time in working in a dental library it becomes very fascinating work. The only trouble is that the hours one has are so limited. As Dr. Hoff said, it seems nearly impossible to show that you have accomplished anything. It is tedious in a way and long drawn out. However, we can see from year to year that something has been accomplished. What its value is in a teaching way I think cannot be estimated.

What I wish particularly to say is that in the storeroom of the library at Washington University Dental School we have about 10,000 surplus journals, and they are at the disposal of this organization or of the dental profession where they are needed by your asking for them and paying the freight on them. So that, as far as those journals are available you are welcome to them. They come to me from all sections of the Mississippi Valley because I have offered to pay the freight from any destination in that locality to the school on any number of journals a person will send. I do it for this reason: I have practically all the journals of the country complete to date, and the journals of the last year are in the hands of the binder. Within a very short time the journals for 1917 will be in the library, as are all those preceding. The surplus I store away, and while it is a good deal of trouble to hunt them up, I am always glad to do it because I believe that I am thereby doing some good for my profession.

In passing I simply want to remark on Dr. Mauk's plan of thesis writing. A few years ago in the city of St. Louis there was great rivalry between certain medical schools as to which one could secure the most appointments in the City Hospital on competitive examination. Finally in one of the schools a change was made in the faculty by the introduction of a number of new teachers. They immediately decided that they would hold no examinations, that they would depend entirely upon written theses, and they would grade and graduate a man according to the work he did in his thesis. The result was that they did this for only one year. At the close of the first year, when the examinations for appointment of internes to the City

hospital were made, this school, which had formerly secured about 75-80 per cent of the appointments, did not get one. They claimed to have found the cause in the fact that no examinations had been held in the school and that consequently the student had not become accustomed to writing examination papears or answering questions. So they failed to get a single man into the City hospital. Since that time they hold more examinations than they ever did before.

Dr. Friesell: I ask one moment to add a little to my testimony. One reason why the University of Pittsburgh has placed the course in dental rhetoric in the third and fourth years is to enable us to make proper use of the dental library in the seminar system as explained by Dr. Mauk. The student does not have the preparation or time to do this earlier in the course, so we have passed it on to the third and fourth years.

Dr. Hoff: I am very sure from the comments that have been made by the gentlemen who have discussed this paper and cited instances wherein the use of the dental library and museum has proven of advantage in cultural as well as educative achievements, that if you had library facilities available such as I have tried to idealize in my paper you would find more illustrative material than you ever dreamed of and you would get a deeper interest in the work itself. In communicating your ideals to your students, you would find it easier and more delightful, and I am convinced your students would become more interested in the work.

The plan Dr. Mauk has outlined I have used in a little different way in my own work in attracting the interest of my students. My students during my absence are having a final examination along this line in which there has been assigned for each day a topic upon which they are to write an essay. And these topics will not allow them to utilize the instructive forms in which my class work has been given; they will have to use their imaginations, their knowledge and skill in writing those topics. To those who are a little doubtful of your ability to accumulate library and museum material I wish to say that if you will simply take this incident that Dr. Kennerly has given us wherein he has accumulated so much valuable material, and magnify the results of his efforts by those which have been accomplished by a dozen other schools in the country similarly situated, you will find that every college has more or less material it is not using and which will be very helpful and valuable in creating a library and museum collection. I am sure that when you once begin this work you will receive more help and encouragement than you anticipate, and that you would find the task less difficult and burdensome than you imagine.

I wish to take this occasion to recommend to you that you visit the Northwestern Dental School in Chicago for inspection of their museum and library, and you should go when Dr. Bebb is there. He has put a lot of work and time in the classification of the collection which comprises this museum, and in organizing it into a form which gives it an instructional value. In fact, he has crystalized the subject in a way there that I never have seen attempted anywhere else. I hope the Institution will meet in Chicago next year and that you all may have an opportunity to see that museum and meet Dr. Bebb. And incidentally, while writing this paper I have had this thought running in my mind: Why not have a man like Dr. Bebb visit all the schools in the country and help to institute libraries and museums in the proper way? There is nothing which the dental colleges of this country could do to better advantage than to secure the services of Dr. Bebb for the purpose of going to the different schools and organizing this department of our work. He would certainly do it better than any one

I know, for he has the proper conception of what is needed and the experience to carry it thru, and he would do it profitably to every one. He could institute and organize this most important department so that it would become, if properly developed, a popular means of instruction. I have understood from Dr. Bebb that he possibly would retire from the profession before a great while and go to farming. It would be a great loss to dentistry to let him drop out of this important work. I do not know of any teacher in the country that we could spare with greater loss than that very man. If he could spend some time visiting and advising our college faculties, he would do invaluable work for us, and I trust that his talent may be sometime utilized in such way.

THE WAR DUTIES AND OPPORTUNITIES OF DENTAL SCHOOLS.

By H. E. Friesell, B.S., D.D.S., Pittsburgh, Pa.

IN THESE strenuous times when millions of men are sacrificing all that is dear to them for the preservation of liberty; and when our country is straining every nerve to develop an all round efficiency that will result in an early and complete victory for the forces of humanity and civilization, over the exponents of the most selfish devilishness in the history of the human race, it becomes necessary for each one of us to consider seriously how every activity with which he is in touch can be developed to the utmost to bring about this result.

The war is so big and so terrible, and seemingly so far away that one is inclined to feel that there is no way in which he can do anything toward its successful prosecution. But the grand aggregate of services rendered by millions of seemingly unimportant participants will make final victory certain.

When the writer watched the posting of bulletins in the city of Boston announcing the beginning of the war in 1914, he was weighed down by a feeling of great depression; but little did he dream that our own country would soon be in the midst of the war. Such a thing seemed utterly impossible, but now we know how true it is. How much deeper we are to get into it, no one of judgment would attempt to predict; but the supposedly impossible happened when war was declared; and supposedly unthinkable in human acts have been repeatedly performed by our enemies since hostilities began. It is therefore only the part of wisdom that each American shall make up his mind that this is his war, and that the earnestness with which he carries on his part in it may have much to do with its final outcome.

The dental schools recognized their duty to the cause of humanity and as soon as our government declared war they unanimously offered their services. When the draft law threatened to endanger the supply of dentists for army and civilian purposes, it was the dental schools who fought out the question and secured the intelligent application of the law to the dental situation. The representatives of the schools have served as examiners without commissions and without pay and have thus enabled that rapid building up of a Reserve Corps that is fully ample to meet any present emergency. As an indication of how this has worked out in the Dental School of the University of Pittsburgh, it may be interesting to note that of 57 members on the faculty, 29 have been commissioned, and six are on active duty, three of whom are already in France. One hundred and sixty alumni of the school have been commissioned, of whom 51 are in active service and 109 are impatiently awaiting the call to active duty. Of the 335 students all men over 21 years of age have joined the Medical Enlisted Reserve Corps of the Army, which means that they will be called, upon graduation, into service in the

medical department, where the training they have had in dental school should be of great value in hospital work. **Experience will undoubtedly prove that the provision of one dentist for 1000 soldiers is entirely inadequate, and if as is hoped, the law may be changed to provide two, or what would be more satisfactory, three dentists per 1000 soldiers, our schools will still be able to meet the situation.**

The clinics of all the schools were immediately opened freely to the enlisted and drafted men, and a large number of applicants for admission to the Army and Navy, who had been rejected on account of dental deficiencies, have been enabled to enlist.

However, the whole duty of the schools has not been met by the foregoing activities. It becomes equally essential that we should take stock of our institutions and study wherein we may do still more to render a larger service in this great emergency. This thought brings us to a consideration of what will be required of the dentist in the army, and whether the schools can do anything to give their graduates a better preparation for such work. Undoubtedly military dentistry will be different in many ways from civilian practice and anything the schools can do to meet the new problems will count just as much toward the successful operation and efficiency of our great fighting machine.

Earlier in the war many of us were inclined to think that much of the work of the army dentist would be in the field of plastic and oral surgery, and a great deal of thought was devoted to plans for developing this work in the schools. However, actual contact with the dental situation as it has developed in the cantonments has shown that the present allotment of dentists will be kept more than busy in taking care of the common dental needs of the men, such as plastic fillings, artificial dentures, prophylactic treatments and extraction of teeth. Statistics show that about 90% of the drafted men have never had any dental attention beyond an occasional extraction. The experience of our Canadian confreres bears out these facts and they strongly urge that we lay stress upon teaching our students to be exceptionally proficient in plate work, and cement and amalgam fillings.

While undoubtedly there will be a great amount of work to be done in the field of plastic and oral surgery; there will be such a vast excess of plain-line dentistry required that the schools must not overlook this fact, as is liable to be the case, owing to the more spectacular appeal of oral surgery.

On the other hand there is a dearth of capable oral surgeons, and each school should aim to select those men who are best fitted by education and aptitude for such work and to assist them in becoming proficient in this field. Not every dental student can be developed into a capable oral surgeon, nor is every school equipped for training such men. There are certain schools which for various reasons, are better fitted for training men in oral surgery than are the others, and the promising young members of college faculties, and the graduating class should be encouraged to go to the schools that are able to give this special work.

While it would be unwise for a school that was not admirably equipped in every way to take up the special teaching of oral and plastic surgery for dentists, every school can do much to make each graduate better prepared for military dentistry than has been necessary heretofore. Intensive work should be done in the anatomy of the head and neck.

The course in conductive anesthesia should be made very complete; and special efforts should be exerted toward teaching each graduate to become an intelligent and capable extractor, as nothing will do more to cause the young

army dentist to lose his nerve, and the confidence of the soldiers, as low efficiency in extracting.

Greater attention should be given to the treatment of fractures and dislocations and all good methods of splinting and wiring should be covered. Gunshot wounds, serious infections, the control of hemorrhage, and the principles of bone and skin grafting should be taught as live subjects and not simply as of academic interest.

First-aid work, bandaging and the treatment of fractures of bones other than those of the jaws should be gone into thoroly, for such knowledge will enable the dentist to render valuable assistance to the medical department in an emergency.

Special facial prosthesis, surgery on the cadaver, and radiography should be given more attention, as more experience in this work will enable the dentist to be of much help to the oral and plastic surgeon.

Unfortunately it will not be long until ship loads of our wounded soldiers will be returning to this country, and our dental schools should get ready to render the greatest possible services to those who may need our help.

Another, and a very important field in which the dental schools have an opportunity to perform a war duty is to be found in the matter of instruments. If by some means we could adopt a uniform or standardized set of instruments for college use, a very long step forward in dental efficiency would result. The making of dental instruments requires workmen skilled in a special field and one where they were none too plentiful before the war. The standardizing of instrument sets, and the simplifying of instrument forms would do much to relieve the shortage in workmen and to overcome the difficulty we are having in procuring instruments.

The government has had so much trouble in obtaining dental supplies that it has strongly urged this action, and the dental manufacturers have been laboring under such handicaps for lack of skilled men and machinery to meet the increased demand for dental instruments that they are willing to cooperate to the fullest extent in any work toward this end.

It is not to be expected that we can adopt finally at this meeting any special set of instruments that would be satisfactory for all schools, nor does your essayist feel that any one man is sufficiently familiar with all departments of dental teaching, and the local situation in the various schools, to enable him to select such a set of instruments; but he was a member of a special committee that was appointed by the Committee on Dentistry of the Council of National Defense to take up this work, and he desires to offer the following list selected by some members of that committee, simply as a tentative set of instruments for college use, and eventually for army use, so far as it may cover the needs of the army.

In making up this set, the instrument lists of 46 colleges were checked over. Two-thirds of the schools would have very little difficulty in adopting this list as it stands; the other third would require more or less extensive adjustment. Your essayist will welcome any suggestions, criticisms, or cooperation offered by the members of the Institute, and hopes that we may be able to approach an agreement on this matter close enough to justify referring the work to a committee for amplification and final adoption by most, if not all of the schools in time for ordering next year's instruments.

Operative Instruments.

For Examination:

Explorers—3-(13-14 R. & L.) 6-17-2-9-10.

Mouth Mirrors—3-52-(6 Mag).

Water Syringe—No. 22, special nozzle; metal, self filling.

Chip blower—No. 22 special nozzle (valve rear); No. 38.

Cavity Preparation:

1 set Black's Cutting Instruments—48-L. H.
1 Chisel—48.
1 pair cotton pliers (College).

For Amalgam Work:

7 Black's Amalgam Pluggers.
1 Woodson's double end, No. 3.
1 Burnisher No. 42 L. H. 7 in.
8 Crandall's Pluggers.
Mortar and Pestle.
Mercury Holder.
Alloy Balance.
Amalgam Carvers.

For Cement Work: Zinc:

Plastic Instruments 39-45-46-47.
Ash's Instruments 1-2.
Cement Spatula: Caulk's (All nickel); Weston's; No. 36.
1 Glass Slab.

Silicate:

Tantalum Instruments.
Agate Spatula.
Glass Spatula.
Celluloid strips.

FOR GOLD WORK.

Filling:

Black's set, 16 complete.
Holding Instrument.
Automatic Mallet.
Hand Mallet—5-15-1.

Finishing Instruments:

2 Finishing knives, 12 and 18 angles.
4 Finishing files, 6 and 94 angles.
1 Black's saw frame.
1 dozen Kaeber saws, 1 edge.
1 dozen Thread saws.

1 pair shears No. 31.
1 Mica annealing tray No. 6, with metal handle.
1 Chamois pad.
1 pair foil carriers—11-12-20-2.
1 Alcohol lamp.

ROOT CANAL WORK.

Metal Broach holders.
Broaches—Barbed; smooth round; smooth soft, square; Kerr *B*.
Canal plugger No. 1.
3 Canal probes—(fine, flexible).
Glass tray for broaches.
Glass slab for sterilizing broaches.
Bottle with pipette thru cork, for alcohol.
Sterile cotton, 1 ounce (canal dressings).
Absorbent paper points.
1 pair dressing pliers No. 2 (Buffalo).
Medicine glasses.
Medicine bottles.

EXCLUSION OF MOISTURE.

Rubber dam holder—8-Wizard.
Rubber dam weights.
Rubber dam punch (Perfected).
Rubber dam clamp forceps (Universal).
Spunk.
Bibulous paper.
Absorbent cotton.
Absorbent pellets.
Cotton rolls.
Rubber dam clamps—18-26; 138-139-201-206-211.
Ivory 1-8-24.
Ivory Imp. Adjustable cervix.
Special third molar, R. & L.
Special, Root R. & L.
Hatch cervical.

Cotton holder No. 1 Raper.
Waste holder No. 6.
Waxed floss.

POLISHING AND FINISHING.

Strips.
Disks.
Wood points.
Rubber cups, 1-2.
Stiff brushes.
Leather wheels.
Moosehide wheels.
Mandrels— 303 — Morgan-Maxfield; Morgan-Maxfield, R. A.
Orange wood sticks.

Cast Inlays:

1 Burnisher and trimmer.
1 pair R. & L. trimming knives.
1 casting ring, sprue and former (Taggart).
1 box Taggart Wax.
Wax carver.

Porcelain:

1 pair K pliers.
1 pair Ball pliers.
4 Thompson burnishers, 3, 4, 5, 8.
2 Camel's hair pencils.

Scaling and Prophylaxis:

Black's set 14 scalers.
Scalers, 33-34-37-6.
Porte polisher, 307.
Porte polisher 307 R. A.

Dental Anatomy Technics:

1 Lowell pin vise.
1 Boley millimeter gauge.
1 Pocket lens—(2 glasses).
Carving blocks—ivory; bone; celluloid.
Wood blocks (small).
Grobet file, half round, 5 in. 1-2-3.

Surgical Case:

1 scalpel, 1½ in blade.
1 Tenaculum.
1 steel probe.
1 silver probe.
1 Grooved director.
1 Exploring needle.
1 pair Artery forceps, 4½ in.
1 pair Surgeons' scissors, 4½ in. straight.
1 pair Gum scissors No. 23.
1 Gum lancet No. 1.

Forceps:

10-15-18 R. & L.-65-150-151-222.
Elevators.
Chisels for Impacted Third Molars.
Hypodermic Syringe outfit.

Miscellaneous:

Dental engine—Cord; cable.
Contra-angle hand piece.
Instrument case.
Separators—Perry A, B, C, D, E, F.
Matrices—Ivory Retainer-1-8.
Steel matrix strips.
32 Gauge copper.
Carborundum stones and points.
Arkansas Stone, 6 inches

Burs:

Straight, contra-angle.
Round, 1, 3, 5, 7.
Inv. cone, 33½, 34, 35, 36, 38.
Fissure, square end, 57-58-60.
Fissure, round end, 57-58.
Finishing burs, 200-201-203-204-219-222-231-232-236-242-245-502-503-504-507-508.
Bi-beveled drills, 102-104.
Wire brush—for cleaning instruments (brass).

PROSTHETIC INSTRUMENTS.

Vulcanite Denture:

Plaster Bowl.
Plaster Spatula.
Impression Trays (upper 2-3-22).
Impression Trays (lower 3-15-25).
Snow New Century Occluding Frame.
Snow Face Bow.
3 Snow Bite-Locks.
1 box Pink Wax.
Wax Spatula.
Vulcanite Flask (large).
Flask Wrench No. 10.
Vulcanite File D. E. Half-round 8".
Felt Cone (large blunt).
Felt Wheel No. 2.
Brush Wheels No. 4, No. 20, No. 26.
2 Lathe Chucks.
Carborundum Wheels, 1½-¼" (grit B. & D.)
Crocker Lathe Arbor.
Mechanical Saw Frame.
Dozen each Mechanical Saws No. 00 and No. 2.
Gas Burner No. 12 and Spider.
18" of ¼" Rubber tubing.
½ lb. Modeling Compound.
3 sheets Sandpaper No. 1.
2 sheets Pink Rubber.
4 sheets Red Rubber.
1 bottle Shellac Varnish.
1 bottle Sandarac Varnish.
1 shaker Talcum Powder.
1 bottle Vaseline.
1 set Wilson's Vulcanite Trimmers (new.)
1 pair Plate Sheers No. 1.
1 Granite Pan (2 Qt.)
1 Book Articulation Paper.

Laboratory Apron.
Plaster Knife.
1 lb. Pumice.
½ lb. Prepared Chalk.
1 two Flask Vulcanizer.
½ lb. Yellow Wax.
2 Camels Hair Brushes.
Pad lock.
Plate Brush.
Chamois Wheel 2½".

ADDITIONAL FOR METAL DENTURES.

Flat Nosed Pliers, 4½".
Horn Mallet.
1 spool 36 gauge Annealed Iron Wire.
1 pair Pliers.
5 dwt. German Silver Solder.
1 piece 30 gauge German Silver Plate.
½ lb. 28 gauge German Silver Plate.
Plate File Grobet (half-round No. 3).
Box Crystal Borax.
Crown and Collar Scissors.
1 pair Imp. Hawk Bill Pliers.
Plate Burnisher.
Compound Blow Pipe.
Asbestos Soldering Block No. 2.
Borax Slate.
54" Rubber Tubing $\frac{5}{16}$".
½ lb. Special Asbestos.
3 lbs. Babbitt Metal (Haskells).
3 lbs. Counter Die Metal.
1 set of 2 Casting Rings.
1 can Calcar.
4" of ¼" Steel Wire.
12" German Silver Wire (16 gauge).
1 Wire Soldering Frame (4x4).
Pair Pliers No. 121.
Riveting Hammer B.
Pair Curved Plate Shears.
Pair Round Nosed Pliers, 4½".
Soldering Tweezers A and L.
Soldering Tweezers, long beaked.
Copper Acid Pan.
Sticky Wax.
Martin's Screw Plate (Holes No. 0 to 13); (Series B).
Draw Plate (Spec).
12" German Silver Wire (12 gauge).
12" German Silver Wire (16 gauge).
12" Stub Steel Wire (93-1000).
1 piece Aluminum Plate (16 gauge). (4x4).
1 piece German Silver (30 gauge).
Rat-tail Metal File, 5" No. 2.
1 stick Rouge.
1 stick Tripoli.
Ladle for Melting Metal.

ADDITIONAL FOR CROWN AND BRIDGE.

1 piece each of 28 and 30 gauge German Silver Plate.
Melottes Mouldine Outfit.
1 pair Ivory Cleavers (large); Metal Handles (Improved).
Pair Root Files (Metal Handles).
Benson's Contouring Pliers.
Hickory Stick 4" long ⅜x¼" tapered to $\frac{3}{16}$x⅛".
Plate Punch No. 1.
Three Crown and Bridge Trays.
Crown Articulator.
Crown Bridge Anvil.

ADDITIONAL FOR PORCELAIN.

1 Fire Clay Tray.
1 Glass Slab.
1 Porcelain Carving Instrument Double End.
1 piece Spunk.

The advisability of an attempt to adopt a standardized set of instruments should be passed upon by this body. It seems to the speaker that it ought not to be very difficult to at least bring about a ninety per cent standardization of the instruments that we use in our college sets. If we do this, it will mean that a greater uniformity in dental teaching in the forty-six schools of the country will result. It will also mean that when our students go out from each and all of these schools and into the Army service, they will have been taught reasonably uniform methods, and they will all be familiar with the instruments that the Government will be able to provide. This is a serious question from the standpoint of the manufacturers. The members of this committee have been appealed to by manufacturers, who are intensely interested in having this

done, and they are all willing to take chances on having those things in which they may be most interested cut off the list for the greater good of the dental profession. The manufacturers are having difficulty in getting skilled workmen and holding those workmen, and also in getting dental steel, altho all the steel used in dental manufacture is as a drop in the bucket compared to the other demands for war material. Anything we can do to relieve the conditions incident to manufacturing a supply of dental instruments sufficient for the need at this time should be done. If this main principle can receive the support of the schools represented here, then a committee could be appointed which could have these tentative lists printed and sent to each school and within a reasonable period, they could be returned with comments from each school and a final list prepared from those corrected lists, following which the schools of the country could adopt a uniform set of instruments.

Dr. T. W. Brophy: The Government has already adopted a list for the Army. Has the list presented here ever been submitted to the Government?

Dr. Friesell: This work was originally taken up at the request of the Chairman of the Sub-Committee on Dentistry of the General Medical Board of the Council of National Defense and was finally approved, and the committee was instructed to go ahead with the work. Previous to that time, however, it was necessary to bring about some immediate re-organization of the instrument list in use in the Army. The existing list was not adapted to present conditions, and it differed so much from that in use in the Navy that when the manufacturers were asked to supply bids for the Army they found it necessary to bring about some immediate changes towards this end. But that was done very hurriedly and was not intended by those men to be permanent in character. Therefore this work was started afterwards, to first be adopted by the schools, and then, as soon as it could be done, to supplant the former and incomplete list now in use in the Army. As stated, that list was adopted on very short order, soon after the dental committee was appointed, and while it was an improvement on the pre-existing conditions, it was not supposed to be final in character.

Discussions.

Eugene H. Smith, Boston:

Dr. Friesell has stated that the crux of his paper is the instrument-list. I am going to begin by discussing the title of Dr. Friesell's paper: "The War Duties and Opportunities of Dental Schools." In replying to a toast on "Opportunity," you may remember that the late Senator Ingalls said: "I knock unbidden once at every gate, if sleeping, awake; if feasting, arise before it is too late, it is the hour of fate." I feel that the dental schools, so far as opportunity is concerned, have been sleeping at the gate. War duties have simply stimulated the officers of our various schools to their duty, to the enlargement of dental education based upon a firmer foundation.

Dr. Friesell speaks, laudably too, of the work of our profession in securing the exemption of the dental student. Every dean of a dental school will, I think, bear me out in the statement that in the beginning of this war, so far as our students entering into active service was concerned, we were given to understand that the dental student would be treated in the same manner as the medical student—namely: exempted from service in the Army and Navy in order that he might be allowed to complete his dental education. It came as a great shock to most of us to find that the Government did not so intend it, that the dental student was not rated with the medical student. That caused

the dental profession to get busy, so to speak, with the results that the law exempting dental students was enacted. But in that great campaign for the exemption of dental students, I do not believe that we impressed the Federal Government that we were so remarkably well trained. It realized, no doubt, that we were giving good service and had been giving good service, but the services of the dental man were not deemed as necessary as were the services of the physician and the surgeon. It is doubtless true that the enactment of that law was brought about largely thru political influence. It was right that we should have such a law, but how much better we would feel if the dental profession had such standing that the law which applied to the medical student might have applied to the dental student as well.

Now, that is the opportunity we have had thru all these years, and war duties and activities have brought it closely home to us. In the face of that fact, does it not behoove us as educators to see that our dental students are better trained (and I mean more thoroly trained) in the medical sciences. There is no question but that American dentistry holds thruout the world an enviable reputation so far as it applies to the technical application of dental work, but as a profession we are woefully behind in the medical sciences which underly dentistry just as much as they underly medicine. And that leads me to refer, if I may be permitted, to Dr. Hoff's paper, "The Value of the Dental Library and Museum to Dental Teaching." Dr. Hoff admits that the library is not used as it might or should be used by the dental student. Why? Because the dental student, in his pre-dental training, has not had sufficient preliminary training to create the habit and the love of reading. That is where it should begin—in the preliminary or pre-dental requirements in our dental schools. Any man in any profession or walk of life, who has had the advantages of a good collegiate course or even two or three years of collegiate work, has in most cases established the habit of reading, and he will read books and use libraries.

We all love to say, and believe it I suppose, that dentistry is a specialty of medicine. If so, why not educate our men as other specialists in medicine are educated? I feel strongly about this, and I have advocated at different times, that the proper training of a dental student is simply this: He should enter a medical school just the same as a medical student enters it, with the same preliminary training. He should take three years of straight medicine the same as students of any specialty of medicine other than dentistry, and then in his fourth year in the medical school he should elect dental subjects which the medical school should accept as work for the medical degree. At the end of four years, the course in medicine now being four years, he should receive his degree in medicine. He then should cover another year in dentistry. At the end of five years, having had two years in dentistry and three years in medicine, he should receive his special dental degree.

Now, that is the opportunity of the dental school, and it is high time we should grasp and put into effect that opportunity.

I have had some difficulty in getting medical men in my vicinity to agree with me in this matter, but am happy to say that a large percentage of them now look favorably upon it. And there is no question but that, if dental schools having a close connection with a medical department would work to this end we would establish a parallel course to the dental degree. The dental schools must necessarily continue for a time now, but in the end I believe it would result in the present system of dental education being abrogated from recognition.

Dr. Friesell speaks of the wounded being brought back to our shores after once the American forces have taken an active part in this terrible conflict. I have considered that and have wondered how much of this facial surgery, including fractured jaw, etc., we might have to deal with here. As it is now these men are not brought back to the base hospital for seven or eight days after they have received their initial wounds and have received only temporary dressings. And to consider that these men would be brought back here before they had received practically all treatment necessary does not seem to me possible. It seems to me that it would surely be unwise to take a man with a badly smashed up face, with multiple fracture of the jaws, etc., adjust splints and appliances, put him aboard a transport and send him back to America. I would imagine that in a rough sea these appliances might seriously interfere with the poor fellow relieving himself in case of seasickness, and disturb all that had been done for him in the hospitals at the western front.

It is a pleasure to us all to have Dr. Friesell tell us of the activities of the dental school at the University of Pittsburgh, with which he is connected. And along that line it might be perfectly proper and interesting to you, for me to say something about what Harvard school has done along that line. We have now at the Western Front something like thirty men in active service. And as a member of the profession it is a satisfaction to me to speak of two men that we sent over with the first Harvard unit in the summer of 1915: Dr. Kazanjian, the head of the clinic in the prosthetic department in the Harvard school, and Dr. Brigham, a recent graduate in high standing. The enlistment for that unit was for three years, to be followed with other Harvard units. At the expiration of the first enlistment of the first Harvard unit, we were asked by the British authorities if Drs. Kazanjian and Brigham might not remain. This request of course was granted and the two men are still at the Western Front. I think this is a tribute to our profession, and it is certainly a great tribute to these men. It is a source of real satisfaction that we were fortunate in being able to send two such men, and especially Dr. Kazanjian because of his skill in restoring to as near normal as possible an injured face or fractured jaw. So much have the British appreciated his work that they have built him a hospital and equipped it. You have all learned from the dental journals what he has accomplished there, and he has enlisted for the remainder of the war.

In regard to instruments, I was a little surprised to learn that this committee is still working for standardization of instruments for the Army and Navy, because I remember that so far back as last May I was asked to act upon a committee appointed from Washington, and to give my views in regard to the standardization of dental instruments for the Army and Navy. In fact, I was invited to go to Washington and remain there indefinitely—they seemed to think they had enough for us to do. I did not feel that I was needed in Washington, and I asked that a copy of the Army and Navy lists be given me, which I would revise. This they did, and I called at one time to my assistance the representative of the S. S. White Dental Mfg. Co., and at another time the representative of the Cleveland Mfg. Co., and we went over the list very carefully. In noting the instruments that have been accepted and were being used in the Army and Navy, what most surprised me was that a molar forceps that the Army thought suitable to extract the upper molar of a soldier did not seem to be the kind of molar forceps that the Navy thought suitable to extract the upper molar of a sailor, for I had supposed that the upper molars of soldiers and sailors were very much alike.

This condition was true of the instruments all the way thru. Therefore it seemed to me advisable that we should introduce to the Army and Navy a standard set of instruments. I sent my report in, what became of it I do not know. Now I am surprised that we are still, after ten months, considering the standardization of instruments for the Army and Navy.

In regard to the standardization of instruments, both operative and prosthetic, for the schools, I think it wise, because students are changing from one school to another more or less, and certainly the instruments which one school has caused him to procure should be accepted and used in other schools.

F. T. Breene, Iowa City:

Referring to the opportunities of dental colleges in the present crisis: one of the opportunities presented to dental schools at the present time is to teach loyalty to our flag and to our friends. We can also teach that those things that are within a man are those things that will come out of a man. We have an opportunity of making a mistake. The Government of the United States has permitted the dental colleges to admit students with the understanding that they should finish their courses before being called into the service. God forbid that the dental schools of the United States be made a harbor for slackers. There is an opportunity for this mistake in medical schools as well as in dental schools. We should keep this in mind as it is liable to leave a mark upon the professional schools if it is abused.

Just a few words in regard to the standardization of instruments. Altho it is desirable to standardize or classify instruments for certain purposes, and now if ever, is the time to do it because we will all join in helping to do everything we can for this objective, yet it is possible that it might be the duty of this Institute to standardize technical operations and then select the appropriate instruments. Standardize and arrange the work to be done, and then select instruments for that work. By so doing I believe we would reach the objective desired.

It was mentioned that it would be desirable to have more dentists for a definite number of men in the United States Army. When it is understood that the average practitioner would have difficulty in completing the work of any two patients in one day, it will be realized that the number of dentists for army service should be increased. You can see from this the difficulty of handling an Army of three million men with the one dentist for 1000 men.

In this connection there is another thing to consider from the humanitarian standpoint, and that is that we are at the point in dentistry where there will be a greater demand for dentistry, not alone for the army, but what is good for the soldier is good for the layman, and if placing the mouth of the soldier in condition makes him more efficient, the civilian will follow to increase his efficiency. This idea will grow, and with ninety millions of people who have never had dental work done the dental instrument manufacturer, as well as the dental profession, will have a problem that the standardization of instruments will aid in solving.

A. E. Webster, Toronto:

Referring to the opportunities of dental schools, this is a rare opportunity which I regret I am not prepared for as I did not see Dr. Friesell's paper before coming here.

I may say that the question of recruiting in the United States and in our own country comprises two distinct problems at the present time. With us, unquestionably it is at the present time a great problem to determine whether or not dental students should be exempt from combatant service. Comparing the population with the number recruited, (when we think, for instance, that in

Toronto, a city of less than one-half million people, 75,000 men have gone over-seas), the common good must come first, and it is a question to be considered whether we should harbor three or four hundred men in the dental colleges when such a large proportion of the population must go to the front. In the United States it is quite different. The proportion, for instance, of three million men now recruited to the total population is very much less than with us; but were it to become ten to fifteen million men, then it would be a question whether young men should remain in the dental schools or not. What would it avail in a short run if we should prepare for the future and be defeated before we get to the line? Take, for example, the food question: Should we have young men in college when sending such a large proportion of the population abroad? What shall it avail if we train dentists to take up the work two years hence and in the meantime starve? Those are problems which our government had to consider. You do not have to consider them at the present time, but undoubtedly if the war should go on these problems will be as serious to you as they are to us. We fully believe, with you, that in the future more dentists will be required than there are now, and that all the dental schools can do will not prepare enough men for the future. But it is just a question of how soon and how long. Three years ago we made a kind of bet that we could graduate, inside of eighteen months, men who would be of service in the war. Now we do not know but that we could take freshmen in and graduate them in time to be of service in the war. We do not know. We are not nearly so sure of the duration of the war as we were then. We may say that in our college we have run almost a continuous session since the war began, summer and winter, preparing men for home and over-seas service. And when we speak of opportunity, we did not start out with any definite notions about what we would do this way and that; we have been in the hands of the Government for now over three years, and we do not know from one week's end to the next what will happen. Up to the present time we have sent over-seas in the neighborhood of 125 dental sergeants. The Government has returned probably fifty per cent. of these to us now, for the purpose of completing their courses and to be of more service higher up in the dental profession. These men have been coming back to us ever since the first of October and are still coming as they can get boats, and I doubt not but in another month they will begin taking them away again. We are running seven distinct classes instead of four besides many extraneous ones. We are in the hands of the Government, filling the niche the best we can according to the conditions that arise. Conditions change from time to time.

With you, you do not need to take many recruits who require prosthetic dentistry or artificial dentures. We did not need to either at first but now we are glad to get anybody whether he has a tooth at all or not. And so it may be with you. We did not begin with the idea that our dentists would require to do prosthetic dentistry. We know now that we must train sergeants to do mechanical dentistry. So these men are being trained in our colleges and are then trained in the army service. What does this training of dental sergeants in the dental school mean to us in the years to come? Every man who has gone over-seas and acted as a dental sergeant, tho he was sent over-seas to do mechanical work, has at some time in his service over-seas been doing operative work under compulsion. These men will return to us undoubtedly with certain rights, and, in my judgment, every one of them will expect a license to practice dentistry in Canada. I should like to see some politician or some dentist get up and say no. To overcome that difficulty we have tried to get into the services of the pros-

thetic department men who have the matriculation standard, and then we would give them certain credit for work done over-seas, and in that way make educated dentists of them.

I just want to say a word in connection with the preparation of men for over-seas. In the beginning, the kind of dentistry that was required was just every-day dentistry—extracting teeth, making artificial dentures and filling restorations; in other words, making men fit to fight. That goes on in any country as it has with us for the first three to six months or eighteen months. Then comes the next step, the repair of the waste and returning it to the front as far as it can be made fit. All those who may be returned to the front are made fit in France or in England. Those who are totally unfit are returned to us, and among these are returned many of the smashed-up faces which must be cared for even for the plastic surgery and the prosthetic restorations. It is in that department that you will find work to do in the convalescent hospitals after your men have been in battles for some time. Some of these men will be returned in a very short time, others will be in a hospital abroad for six to eight months or a year before the plastic surgery can be completed sufficiently even to allow them to come home. We find thruout the hospitals in Canada thousands of men who have returned and are requiring plastic surgery, oral surgery, and prosthetic restorations. The latter are made temporarily perhaps in France or in England, and then the permanent operations must be made here. With us the attempt is to return men as soon as possible to civil life, and every man is given the benefit of the most skilled dentistry that can be performed—an entirely different kind of dentistry from that which is given the men before they go to battle. As quickly as possible we prepare men for the front, and then repair the waste afterwards as permanantly as possible. At the present time there is a new order: Our dental surgeons at home are now required to do very largely the extracting and prepare the men as far as possible for receiving permanent prosthetic restorations, when they reach the camps of England or France, so that there may be no delay in getting to the front. Conditions change and then we have to change. We do not know what Hindenburg will do next, and so our conditions change.

In regard to the standardization of instruments, I hope the time will come when we can have some kind of uniformity in instruments used, so that we will not be teaching at variance with each other. There is surely one best way and one best instrument with which to do the work.

H. M. Semans, Columbus.

Since the 6th of October I have heard the words "exempted" and "exemption" used in reference to dental students, and I want to stand corrected if I am mistaken in what I am going to say. I understand that our dental students who are 21 and over are enlisted in the Dental Section of the Medical Reserve Corps as privates, and that they are subject to call of the Surgeon General at any time. That is the way I understand the situation.

A. W. Thornton, Montreal.

I wish to refer to one thing that Dr. Webster said in regard to the exemption of dental students during the period of their training as dentists. I am not sure that the whole thing is not a mistake, and for this reason: We have found in some of the schools of Canada that many men, who have come to that country to escape certain conditions in other countries, are striving now to perpetuate the very conditions that they left in their own country. They have no country in fact, and it is these least patriotic men that are entering the medical and dental schools of Canada, disarranging our medical and dental faculties. They have come from other countries, and,

without becoming citizens of the Dominion, have become students in our colleges in order to evade military service. We can do nothing with them, while our native youths and young men, who are students, are being taken into the military service right along and have been taken since shortly after the war broke out. It is a mistake, and if there is any way to obviate it, it should be obviated.

In regard to the standardization of instruments, there is a more important thing—to standardize the men that go over. Some members here talk as if only the recent dental graduates were to go into the Army service. Every country that has gone into the fight has made mistakes, and when the United States entered we hoped that it was going to escape some of the mistakes that England, France, and other countries have made, but they have not escaped them all. But if the dental profession is going to stand shoulder to shoulder with the other professions and other men of the Army, they must send something across other than recent graduates, for these cannot establish there the standard that should be established. Therefore the profession of the United States should, if possible to do so, send men who have been in practice ten or fifteen years—men who have had the experience that only office practice or teaching practice can give them. If I had my way I would establish a committee in this country that would pass upon every man who asked for enlistment, and that would go to the teachers in the various schools and ask them to volunteer for service, knowing the sacrifices which they would be called upon to make. And then we would have men at the front of whom we would be proud. Many of the best men in Canada went, but there was not enough of that class, and it has become a saying in Canada that the Dental Corps has been a place for the misfits of the profession. Do not understand me as meaning that all the men who have gone are misfits, but all the misfits have gone, and you may have that difficulty to contend with.

In speaking of the rights of dental students who shall finally return to Canada after rendering professional service in the Army, Dr. Webster states that he would like to see some politician get up and say that these men should not receive licenses to practice. One of the members who left New York on heatless day and struck this community on meatless day, suggested that perhaps the time would come when there would be a wireless politician, in which event we can perhaps do something.

Major H. D. Arnold, Washington, D. C.

I believe it was on the program that I break into this discussion some time, and the raising of the question of exemption and one or two other topics seem to offer the proper opening.

The problem now up is a very important one, and this is the reason why the Surgeon-General has asked me to come here and confer with you as to the way in which we are to deal with it and get your help in its right solution. Whatever you may feel about the desirability of dental students not going into active duty at once, if we are using the word "exemption" let us use it with the understanding that it is merely a matter of convenience. There is in one sense the "exemption" of dental students, in that they get what is technically called now a deferred classification. Do not misunderstand it, however. They get that deferred classification *only* because and on the ground that they are in the military service. A point which is coming to my attention every day applies not to the dental student, but to the dentists who are of draft age. They, too, are eligible, under the provisions of the Selective Service Regulations, for deferred classification in Class 5,—the last class. A good many dentists have only looked so far, and expect to be exempted from the draft and left in civil life. They get that classification only because and on

the ground that they are in the military service of this country; and the regulations state specifically that it shall be granted on no other basis.

The question of what is done with the men who enter the military service in the enlisted reserve corps is a question of army expediency. If they can be utilized to better advantage one year, two years, or three years from now as dental surgeons than they can be today as dental sergeants or privates; if in looking ahead to the possible exigencies of this war we believe that in these early days of our work, as was pointed out, a different situation prevails from that which pertains in Canada today; if we can now afford to take some of these ten million men that are eligible for military service and save them and train them for the future; that is a legitimate thing to do in the military service. And for the present it is the policy of the Surgeon-General to allow dental students and medical students to remain in inactive duty in order to secure an education which will supply us with better educated and trained officers along dental and medical lines. We have no right to put those men in inactive service when their brothers are in the fighting line, *except* for military purposes. We absolutely have no right to create a class of privileged persons for the purpose of studying anything they please, when they should be serving in the Army. No such provision was intended or will be tolerated.

Your dentists who are graduated, who have received a training which is adequate for the purposes of the Army, on what basis can they claim inactive duty? At present they cannot. It may be that in some few individual cases their presence in a dental school as teachers of enlisted men may be a legitimate Army purpose, but there is absolutely no excuse that we can see why the graduate dentist of draft age should be left in inactive duty in general practice. If you will carefully read the instructions and regulations published by the Surgeon-General's office, you will see that point is covered and that graduate dentists of draft age will be called into active duty as soon after they enlist as their services can be utilized in the enlisted corps of the Medical Department. And we are not going to wait until they can necessarily be employed as dentists.

So much for the problem of exemption.

There has come up the problem of standards, and that is the real point that I am here for. It seems to me I could talk a long time on this subject, but I will be very brief. I think all you men representing dental schools, and the body of dental teachers, should understand the opportunity that is presented by this war. We have come to you for guidance. The Surgeon-General is obliged to prescribe certain regulations under which these selective service regulations shall be carried out. We are asked to see that they are carried out in the right spirit so that only the proper people shall be taken in and educated for Army purposes in this line. This undoubtedly brings up the question of standards—standards of schools, standards of admission requirements particularly, standards of course of instruction and standards of time. On these points we want guidance. We try to make it as simple as we can and we say that students will be approved for the enlisted corps from "well recognized" medical and dental schools. Now, what is a "well recognized" dental school, or what should a "well recognized" dental school be? That question the Surgeon-General would like to have the dental profession decide. You are the ones that are competent to decide it, and we believe that an appeal with this explanation will be followed by not only a patriotic, but an intelligent solution of that problem. To apply these rules fairly at the present moment we have to know what the right standards are, but to you comes the opportunity of putting dental education

and the dental profession on a basis to receive the recognition that you gentlemen are asking for. That is the war opportunity that is before you today. From the preliminary talk that I have had with some of your leaders, I believe that you are going to rise to that opportunity, that you are going to tell us the right solution of the problem as to what a "well recognized" dental school should be, and if you will, you will have our everlasting thanks and you will be rendering one of the biggest services not only to us in this war-time, but to the whole country in the time that follows the war.

Major W. H. G. Logan, Washington, D. C.

I only desire to speak briefly on the subject discussed by Major Arnold, for he has brought before you a very important question.

For a long time the members of the Dental profession, particularly those men who constitute the membership of the National Dental Examiners Association, the National Faculties Association and the membership of this Association, have been trying to reach a decision as to what constitutes a well-recognized Dental School and what constitutes the proper preliminary education that applicants should have who are accepted in Dental institutions, but up to the present time an agreement has not been reached on this important subject. However, with the declaration of War and the enactment of law, which permits Dental students of conscription age to continue with their studies, providing they are in attendance upon well-recognized Dental schools under such Regulations as shall be laid down by the Surgeon General, it naturally makes a demand that the Surgeon General have the information as to what schools are to be known as well-recognized Dental institutions, for he cannot permit the enlistment of students in the Enlisted Reserve Corps of the Medical Department for any other type of student from a Dental institution.

Therefore, if all those interested can, in cooperation with the Surgeon General's Office, reach an agreement with the Surgeon General's authorized representative, Major Arnold, as to what schools are to be classed as "well recognized" Dental institutions, the War Department then will be able to restrict the enlisting of Dental students who are in attendance upon authorized Dental institutions.

There seems to be some misunderstanding on the part of some of you to the effect that a Dental or Medical student is exempt from military service when he enlists in the Enlisted Reserve Corps of the Medical Department, whereas, the facts are, that any student or dentist who enlists in the Enlisted Reserve Corps of the Medical Department is not exempt, but is then and there inducted in the military service subject at all times to be called to duty by the Surgeon General when and wherever needed.

In reference to the standardization of Dental instruments, Dean Smith stated that he thought this question was settled some months ago and, in a general way, that is correct, for the Army is not now asking that question. They are buying the instruments that they believe to be suitable for the purpose intended. However, on further consideration it is likely that changes may be indicated as war progresses, for the reason that the teeth requirements for our conscripted men in our next draft will be different than it has been heretofore; in fact, when the present supply table was made out it was not contemplated that there would be any extensive amount of partial plate work made in various camps, but conditions as they occur must be met.

However, this country will not accept at the present time for general military service a man unless he has a minimum of six masticating teeth, three above and three below, opposing, and three incisors,

above and below, opposing—the cuspid being counted as an incisor.

With reference to the acceptance of Freshmen students in the Dental schools, it would seem to me there is need to restrict the number to be accepted in each institution, for you cannot open the doors to every man who might wish to stay out of the Army and also all men who conscientiously desired to enter the Dental school. It would seem wise that each institution be limited to the number they can accept with reference to the average number they have had in actual attendance in the Freshman class during the past five years. Furthermore, you should drop from your institution every student who does not live up to his opportunity by making the proper grade to advance from one semester to the next or from one class to the next.

In regard to the present Senior class receiving commissions in the Dental Reserve Corps, I am of the opinion (and it is only an opinion that I am here expressing) that not one of the present Senior class will be permitted or needed in the immediate future to receive a commission in the Dental Reserve Corps, as the Department now has a sufficient number to care for the requirements permitted by law for an Army of over five million men.

Naturally, some of your teachers of military age, who hold commissions in the Dental Reserve Corps, will desire assignment under their commissions in the future, as will the Department desire some of them to give service because of their efficiency.

N. S. Hoff, Ann Arbor:

In the light of this discussion it seems to me that we are up against a very serious proposition. These gentlemen have thrown back upon every member of this teaching body the responsibility for the Dental welfare of our Army. What are we going to do about it? Are we to recommend for this service men who have been able to get our degrees only, knowing well that many of them are incompetent to render the service which we now know is required at the front? Are we to allow even unfitted practitioners to enter this service regardless of whether they are properly trained for these requirements or not? It seems to me that we are in a position where, if we do not help in this particular place, we are not loyal to the cause. In fact, it seems as tho it were a more serious matter than that: For when we knowingly allow incompetent men to go into responsible positions in the Army, we are in the same position we would be if we were to knowingly allow an enemy to enlist in our Army. This would be a very serious position for us to face. I for one do not want to be placed in that position. Isn't it true that we know more about our students than does anyone else? We have worked with them and know what they are ordinarily capable of doing, and are not we in position to advise our representatives in Washington as to the proper men to send over-seas into this great and responsible work? And wouldn't doing this faithfully, regardless of whom it affected, be the best way in which we could serve our country? We know that in some instances our students just barely get thru the course, they show little aptitude for this work, and especially no aptitude for the practical work they are liable to be called upon to do, and should we recommend men of that sort for positions of so great responsibility? I do not think so. We should recommend only those men whom we conscientiously believe will fill these positions with credit. It seems to me that it would be competent for this body to pass some resolution that will influence the executive officers in our dental faculties to seriously consider this matter and to be very cautious about the kind of men recommended to the officials in Washington for this service. Would this not be a good way to establish our willingness as helpers in a scien-

tific way in this great cause? If we are going to be honest and patriotic and serve our country in the best way we shall have to do this. If we cannot recommend recent graduates for this work, then let us say so frankly and encourage qualified practitioners to go, and place the recent graduates in the offices of those practitioners who are competent to do the important work for the men in the trenches. This seems to me to be the logical thing to do in the light of what we have heard here today.

F. R. Henshaw, Indianapolis, Ind.

I do not know whether I misunderstood Major Logan or not. If I did not, then it seems to me that the thing Dr. Hoff has spoken of is in a way being solved by the Department itself. I gathered from Major Logan's remarks that a training school for dental surgeons is being established at Fort Oglethorpe. As you all know, some of us at least clamored all last spring and summer with the hope of getting the establishment of a dental training school that would serve the same purpose as the medical training school. You know what they do at the latter. At Fort Benjamin Harrison, if I am not mistaken, the men came under commission. If they did not make good, if they did not qualify, they were removed. Certainly the Surgeon-General's office is capable of selecting a group of experts who can take these men and train them, and if they are not competent, if they do not show up with the necessary ability, remove them. That does not devolve upon the professors in our schools. It would be rather embarrassing for Dr. Hoff to say: Here are seven students, three of whom are not fit to go into the Army. But, on the other hand, Dr. Hoff would be glad if Major Logan were to say: I have tried this boy in this particular service and he is not competent, I am going to send him back home. And that is what Major Logan meant should be done.

I have personally tried in various ways to get somebody who could bring this about in our section. The Congressmen and Senators from Indiana, are now interested in the idea of a training school for the Dental Reserve Corps along exactly the same lines as the medical. We have not gone anywhere near so far, but I think it is being impressed now. I hope so, for it will solve the problem of only those men that are fit going across.

Dr. Henshaw: Is it not your idea, Major Arnold, that your committees or your instructors are the competent people to pass upon the qualifications of these men, rather than the examiners, we will say, in the various states? In your training school are not you prepared now to say whether this man shall remain with this particular regiment and go forward, or whether he shall go home or be put in some other place?

Major Arnold: It seems to me that the selective process is best. It is desirable that you shall sift the graduates first as best you can, sending those you believe fit to us; and we will sift again. Then you will have men in the Dental Corps of whom you will be proud, and the others will be sent back.

Dr. Friesell (closing the discussion): While the political wire may have been necessary at one important stage of the procedure, you can make up your minds that if the dental school men of this country had not analyzed the situation or foreseen it, and if five men in particular who are all in this room at this time had not spent six months of pretty hard work on the problem, we would not have had for the dental student that thing which some people misconstrued when we loosely applied to it the term "exemption." And being one of the five and having spent six months on the work, I feel that I am well able to judge what brought about most of the influence that produced the result. I want to say also that no dental school I know anything about, and no dental school men

that I know, ever asked or desired or suggested in any way whatsoever that dental students should be exempted, and no dental man that I know anything about wants dental students exempted. But there is a field for the dentist in the Army, and it is a very important field. If dentistry is important in civil life, it is just as important in the Army; or I might put it this way: If dentistry is important in civil life, it is more important in the Army, because the man in the Army must live in conditions which, considered from the physical, mental and nervous standpoints, far exceed in untoward influences those conditions which the individual in civil life must meet. We have relatively a thousand men who can go into other lines of Army service, for one man that can go into the dental service. Why should we, in our inexperience or in our ignorance, take the one man who is partially educated along this line of work and put him in a place where we can put a thousand men who can do that work as well as he would do it? You can make a good fire out of mahogany, but you had better use something less expensive, and that has been the basis of the Army dental situation. Very few dental students have asked for exemption or wanted exemption, and if some provision had not been made by the Government to hold these men and to give us an opportunity to convince them that they were doing a bigger thing by carrying on this work than they would by going off to enlist, our dental schools would have had very few dental students. Before the Government took any steps that made it seem that dental students would be given an opportunity to eventually get into the service in the line for which they were best trained, at our University we started these men at military training so that they might feel they were doing something. If it had not been for that, fully ninety per cent. of our men would have enlisted; in fact many had enlisted and we had to bring them back from the cantonments later.

Personally, I would much prefer to have certain kinds of dental work done by men graduated in the last year or two, than by most men who have been graduated ten years. Furthermore, I see nothing in what I have termed the plain line, every-day dentistry required in the Army, that the man recently graduated cannot do and do properly, and if he cannot do it properly he had no right to be graduated. True, he cannot do it as rapidly as the man who has had more experience, but if he has one thousand men in the Army to take care of he will soon acquire sufficient experience to be able to do the work rapidly. He is better fitted, he has not the family and business obligations that men longer in practice have. Therefore I think the proper thing to do is to take the young men and put them thru a course of preparation for some special lines of work that may develop in military dentistry, the system that must be followed out under those conditions, and also for the purpose of checking these men up to see that somebody has not gotten in thru sympathy or slipped in thru a hole in the sieve that should have kept him out. Of course, each of us can speak only for our own men. But I want to say here with all earnestness that I do not know a single man in this section of the country who has gone thru that sieve into the Army that we are not perfectly willing to stand back of, for we know he will give a good account of himself. We do not need to worry about the young man being able to "deliver the goods."

In regard to the taking of teachers, that is a serious matter. If the Government believes that we must train dentists, if it feels that the men who are training these dentists have the proper conception of their patriotic duty and the intelligence to apply it to the situation, then it ought not to have any doubts

as to who we let into our schools. And if we are to take these men and train them, we cannot do it without our teachers. If you take from our faculties the all-time men, then you might as well take our students. And there is no use talking about our getting older men and putting them on the faculties to teach our students, for we cannot bring the older men in and have them teach the classes we have today. There are not enough of the older men with proper preparation who can teach modern dentistry efficiently, who can teach the classes of men that are coming in now with the preparation that is required. If you try to take men who have been in practice ten to twenty years, you are going to make a failure of the whole thing.

I believe the proper thing for the schools to do is to indicate who on their faculties can be spared, and to also indicate those who cannot be spared. Those men who are honestly, in the minds of the executive officers, accomplishing more for the country in their capacity as teachers than they could do as dentists in the Army, should be left in service. If you let them go you might as well take half the students along with them.

There is a body composed of men who are familiar with existing conditions that has been laboring for years in establishing what are the proper standards in dental education, known by most of you as the Dental Educational Council of America. It has the ideas, the experience and the information upon which to establish these standards and upon which to classify schools, and this can and will be done very shortly by that body. In fact, their warning has gone out and the schools know that within a few months the standards will be fixed, and then the Surgeon-General's office will have something to go by.

One point which Major Arnold tried to stress as the most important point, the one point which held back this paper until the last moment, was the matter of standardizing as far as possible a sensible and desirable list of instruments used in our schools. Major Arnold believes that this is an important feature which should be taken up at this time, and would like to have the support of this body in that work. He asks that a committee be appointed to go at the work seriously, take it up with the individual schools and be prepared in the near future to recommend a standard set of instruments which it seems to him should meet at least ninety per cent of the requirements of the schools. A careful study of this question has been made. Two-thirds of the schools could adopt the recommended lists now, and those schools are teaching practically uniform methods. And if two-thirds of the schools of this country (to be definite, 31 of the 46) have taken up a certain method of work and have found it sufficiently good to adopt it, then it seems to me that the other fifteen schools with fifteen different methods ought to investigate what the majority of the schools are doing and adapt their work to that standard.

REPORT OF SECRETARY-TREASURER.

Mr. President and Gentlemen:

Your Secretary-Treasurer begs leave to submit the following report:

At the outset I wish to express appreciation of the co-operation which the members have given me in carrying out the duties of my office during the past year.

There has been no change in the membership of the Institute during the year; we have lost no schools thru resignation or otherwise, neither have we gained any new members. The present membership is forty-six. An application has been received from Columbia University, School of Dentistry, New York City, which is in the hands of the Executive Board.

The problem of financing the Proceedings this year has been one of considerable concern because of the increased cost of printing as well as an increase of forty odd pages in the size of the Journal. This has involved an expenditure of about two hundred dollars more than last year. The number of copies was seven hundred, practically all of which have been mailed to members. There are a few here for distribution and a few reserve copies are in the hands of Dr. N. S. Hoff who has volunteered to act in the capacity of custodian of our reserve files.

I wish to submit the following financial report:

Jan. 24, 1917, Balance on hand		$ 705.70
Dues for 1916	$ 20.00	
Dues for 1917	360.00	
Dues for 1918	760.00	
Bank Interest	16.00	1156.00
		$1861.70
Disbursements per Ledger	$1095.41	
Cash on hand	766.29	$1861.70

At the present time dues from eight colleges remain unpaid ($160.00) as compared to twenty-eight at the opening of our meeting last year. In addition to these resources we have a quantity of linotype which has been accumulating for several years comprising certain copy for the Proceedings that remains the same. This represents a valuation of about fifty dollars.

According to the usual custom I now hand my books and records to the Executive board for approval and audit.

Respectfully submitted,

ABRAM HOFFMAN,
Secretary Treasurer.

January 29, 1918.

HOW TO TEACH ASEPSIS IN A DENTAL COLLEGE.

A. E. Webster, L. D. S., D. D. S., M. D., Toronto.

THE title originally chosen for this paper was "How to Teach Sterilization in a Dental Infirmary." This title seemed so limited and inadequate in discussing so important a subject that the author ventured to change it to "How to Teach Asepsis in a Dental College."

The essential difference between squalor and decent living is one of cleanliness. It has taken the human race longer to learn to be clean than to learn to be religious. When students enter Dental College they must be pretty well on the way to cleanliness or the staff has a herculean task before them. Much more is learned by example than by precept, hence the College should be built and kept in such a manner as to be a constant example to the student in cleanli-

ness. The teaching staff should be examples of cleanliness in fact as well as in appearance. Every opportunity should be afforded for the student to keep clean. There should be running water, clean basins, clean lavatories, electric current for sterilizers, soap, towels, wipes, gowns, caps, gloves, and no dusty or dirty corners. Both staff and students must be brought to realize that a Dental College is a combination of a hospital where infected patients are treated and a school or college. No unclean conduct should be tolerated. It should be no part of a student's training in dentistry to assist in the janitor service nor should he be permitted to make unnecessary work for the janitor.

Usually the very first exercise given a dental student when he enters college is one that destroys in him any idea of neatness, tidiness or cleanliness associated with dentistry. About fifty men are asked to mix plaster at one bench and get the water and plaster from one tap and box where there is room for but one or two at a time. Students who have been allowed to slop around a laboratory for a year or two cannot suddenly be neat, orderly, and clean on the first sight of a patient.

Operations on root canals done in the laboratory under anything but aseptic precautions will not be aseptically performed for patients. Asepsis cannot be successfully taught in the infirmary if the student has done similar operations in the laboratory under other conditions. The infirmary is the place for the student to put into practice what has been learned in laboratory and lecture room.

New problems in dental education must be faced at once, and in no part of the work does it present itself more directly than in sterilization and asepsis.

There are few, if any, dentists of today who play the part of janitor, charwoman, nurse, bookkeeper, private secretary, housekeeper, dental mechanic, engineer, artist and dental surgeon. Very few do more than act in the capacity of engineer, artist and dental surgeon. Then why should dental students spend so much of their time in doing work that will, in their practices, be handed over to some one to do whose education has cost much less. The public has no right to pay for a dentist's time to sterilize instruments, vulcanize dentures or clean up the office. Women can do all these things better than men and at much less cost to the public. The bricklayer may know much more of the technic of laying bricks than the architect, but it does not follow that he could design and construct a better building, so with the dental mechanic, he may know much more of the technic of finishing a denture but it does not follow that he could design and construct a more suitable denture for a patient. The dental student should study all these subjects for their educational value and so that he will be able to instruct his assistant and appreciate high technical skill. The dental student must be taught to perform dental operations for his patients and direct everything else done in a dental office. If this be true, why require students to repeat operations again and again just for speed and accuracy in polishing dentures or scrubbing instruments, because such operations will not be performed by him in private practice.

It is a very simple matter to teach a student how to sterilize instruments but a vastly different thing to teach him how to perform an aseptic operation. One lecture, one demonstration and one exercise on sterilization is all that is necessary but it takes many lectures, demonstrations and exercises before a student can appreciate all that is involved in an aseptic operation on vital tissues. Hence all operations performed in the labaratory which would require aseptic conditions in the mouth must follow the same aseptic ritual.

The proper time to teach a student the value of a dental assistant is in his laboratory course in operative dentistry. The dental assistant should be present

in the laboratory during the instruction in sterilization and the exercises that follow, and during the training in asepsis. It should be her duty to see that the student is properly equipped and carries out asepsis.

EQUIPMENT.

Each student should buy for himself a suitable electric sterilizer which will provide both wet and dry sterilization. The college should supply the necessary current in both laboratory and infirmary, besides a suitable storage place for the instrument.

Methods of sterilization and aseptic operating must be taught in regular graded exercises the same as cavity preparation or the use of the rubber dam.

A lecture on sterilization is better than nothing. A demonstration is better than a lecture. An exercise is better than either. All three are better than any one or any two.

The teaching of asepsis should be a part of the regular laboratory course in operative dentistry and taught with all the detail that is followed in any other fine dental operation. The subject should be opened with a short talk on the history and development of aseptic surgery. Then should follow a demonstration before the class of the sterilizer, its workings and its care. An exercise should follow while the demonstrators and dental assistant go about the class assisting, quizzing and answering questions. A reading lesson should be set for preparation for the next session. At the opening of the next sesson the students should be quizzed on the former laboratory lecture, exercise, and the reading lesson.

The general lectures on asepsis and sterilization should follow on after the laboratory course.

To succeed in teaching this or any other subjects the student must be taught one definite method and he must practise it often enough to know it before any other methods are described in the general course.

A Sample Lesson in Asepsis.

A Sample Lesson on sterilization.

Students were told at the last laboratory session what equipment would be required for this session.

Short Lecture or Talk—10 to 15 minutes.

Reference, (Black) Operative Dentistry and Bacteriology.
Lecture 5.

Methods of destroying vegetable life.

Withdraw nutriment.
Drought.
Heat.
Poisons.
Electrolisis.
Trauma.

Seeds and spores, purpose of

Give examples of each as they have come within the student's own observation in life.

Quickly trace the history of;—

Methods employed to destroy bacteria in vital tissues.

Heat, discuss.

Limitations.
Methods of Application.
Dry heated air.
Moist heated vapor.
Wet heat.
Open flame.
Usefulness of each method.
Show the sterilizer.
Demonstrate how to connect it up and make a running talk on the current used, the connections, the control plug, the automatic cut-off if over-heated and etc.

Exercise.

1. Each student to put water into his sterilizer, connect it up and turn on the current.
Demonstrate how to put instruments into the sterilizer, how long to boil them, how to remove them and prepare them

for use. Explain the use of bicarbonate of soda in the water.

2. Students place some instruments into the sterilizer and boil them.
3. Remove the instruments, prepare them for use.
   Demonstrate how to use clean instruments in excavating a cavity in a natural tooth and how to wash and clean them ready for sterilization for the next patient.
4. Students excavate a cavity in a natural tooth under aseptic conditions.
5. Scrub, clean and sterilize instruments.

Reading Lesson.

Students come to the next sesson prepared on Chapter.....

Appended is a list of the headings under which this subject might be taken up in the Laboratory:

1. Preparation of the operator.
2. Preparation of surroundings.
3. Preparation of instruments and equipment.
4. Preparation of materials.
5. Preparation of patient.
6. Preparation of the mouth.
7. Preparation of the field of operation.
8. Preparation of soft tissues.
9. How to clean up after an operation.
10. Methods of sterilization
    (a) Inert substances.
    Such as cutting instruments, broaches, rubber gloves, burs, cotton wool etc.
11. How to test methods of sterilizing.
12. How to take cultures and inoculate media.

DISCUSSION.

Dr. H. B. Tileston, Louisville.

Asepsis in dental operations by means of securing and maintaining a sterile field and sterile instruments is essential to successful practice, especially in all cases involving the soft tissues and in the treatment and filling of root canals. This fact being admitted, then as a matter of course, students of dentistry should be instructed and drilled in the observance of the details requisite to securing and maintaining aseptic conditions in their clinical operations.

Just how best to teach this is a problem. This very excellent paper presented by Dr. Webster goes far to solve this problem. If his ideas and suggestions are open to any criticism it would be on the question of practicability.

The environment of a large dental clinic, with from fifty to a hundred and fifty students working at as many chairs all in one room, is not favorable to a strict observance of asepsis. It is not possible to surround each chair with a sterile zone such as a dentist might reasonably approach in his private operating room. Instruments and appurtenances rendered ever so sterile would not long remain so under such conditions. Still this offers no excuse for omitting the observance of every item of procedure to the minutest details, in securing the semblance if not the reality of asepsis. The student will be benefited to the extent of learning how at any rate.

The treatment and filling of root canals is the operation to which we devote our most strenuous efforts towards asepsis today. Someone suggested at the meeting in Philadelphia, I think it was Dr. Squire of Buffalo, that a separate room be provided for root canal operations where every provision for thoro asepsis could be supplied. The idea was to impress the student with the essential fact that the treating and filling of a root canal was something different from cavity preparation, and crown and bridge work, and demanded as near absolute sterility as was possible to attain. Moreover, the results secured under such conditions would speak for themselves. The objection to this plan is the

difficulty and cost of providing a separate room equipped with all the paraphenalia necessary and large enough to care for all such cases occurring in a large clinic.

The next best thing to the separate room idea, in my opinion, was suggested to me by Dr. F. R. Henshaw of Indianapolis last year, and he presented me with a small cabinet he had contrived for students' use. It consists of a wooden box eight inches wide and eight inches deep by six and one-half inches high, the entire front opening with a clasped door. Inside is a perforated shelf and beneath that a shallow drawer, also perforated, with deeply grooved receptacles for broaches, cotton points, etc. At the bottom is a porcelain dish to hold an absorbent pad and a piece of borax wet with formaldehyde. The whole is finished inside and outside in white enamel with nickel plated handle and hinges. It makes a very neat appearance. In this cabinet everything connected with root canal or pulp treatment is kept and nothing for any other purpose. This serves to impress the separateness of these procedures from all others and has the merit of being practical. The only objection to it is its size. I suggested to Dr. Henshaw that he reduce the dimensions about one-half, so that it could be more conveniently handled, and stored when not in use by the student.

Dr. Webster says that each student should be required to purchase an electric sterilizer which will provide wet and dry sterilization. Electric sterilizers are very expensive, are difficult to properly care for, and after use thruout a college course would be practically worthless.

If students are required to scrub their instruments with a stiff brush and green soap, or better, with sapolio, in running hot water at a basin provided for that purpose in the infirmary, and then sterilize them in a large steam sterilizer havindividual containers for each student, after the manner in use at Northwestern University, the results would be entirely satisfactory both from a practical standpoint and its educational value.

Excavators thus sterilized could be placed in clean instrument cases and be ready for use when required.

Scalers and pyorrhea instruments should be sterilized just previous to use and kept immersed, at least their working points, in one per cent lysol solution while operating.

Root canal instruments should be placed in the Henshaw cabinet, when removed from the sterilizer, where they will be further sterilized and kept sterile up to the moment of use by the formalin gas.

The outline of a teaching course in asepsis offered by Dr. Webster is fine. Probably it need not occupy many periods but should be thoro and complete both in theory and practice. I heartily endorse his contention for strict adherence in the laboratory course to the "aseptic ritual" which is to govern like procedures in actual practice in the clinic. The teaching of asepsis should not be left entirely to one instructor and totally ignored by all others. Every teacher whose subject has anything to do with operations upon vital tissues should stress asepsis by precept and example, wherever and whenever opportunity presents.

MODIFICATIONS IN THE TEACHING OF ORAL SURGERY AS A WAR TIME MEASURE.

Chalmers J. Lyons, D. D. Sc., Ann Arbor, Mich.

THE subject of the Teaching of Oral Surgery has been presented before the Institute many times in the past. It seems to me it has been discussed from every conceivable angle, and it would only be a reiteration of what has already been presented, if I attempted at this time to correlate the subject as it evidently should be taught.

As my contribution then to the war symposium, I shall confine my discussion to the modification in the teaching of oral surgery as a war time measure. The preparation of the graduates in dentistry during the war must of necessity be modified in order that they may be equipped to fulfill all of the duties which they may be called upon to perform.

The service which the American dentist will have to be fitted for now will be peculiar in that the conditions under which they will be placed will be such as will try the skill and ingenuity of the highest educated men in dentistry.

The profession of dentistry at this time has had thrust upon it a tremendous responsibility, the magnitude of which staggers the most sanguinary men in the profession.

Dentistry is on trial in this great war. It has been legally accepted in all of its phases as a branch of medicine. The dental student has been extended the same privileges as the medical student to obtain his professional education. By what steps now are we to show that we are worthy of this trust? It is quite true that dentistry has been doing noble work in the past in dealing with the ills of humanity. The efforts of the past, however, are not sufficient to carry us over the present crisis in establishing the final evidence that our profession is worthy of this confidence.

It is the duty of every department in the colleges to neglect nothing that will further better qualifications in our recruits into the profession. The dental colleges should have one great aim in view, viz., to graduate men in their respective institutions who will be so well equipped that they can perform the greatest possible service to their country and to humanity.

Now the question arises, which is most germane to this paper, what can the department of oral surgery do to better equip these men who are going into the service of their country? It is possibly a little early to speculate on just what the role of the dentist will be in the army medical corps. However, it is our duty as teachers to prepare them for all eventualities pertaining to dental surgery.

We will discuss briefly the preparation of the dentist for the service. The department of oral surgery should be held responsible for the preparation of these men in the administration of local anesthesia, the extraction of teeth, the removal of impacted teeth and in the surgical treatment of pathological conditions in and about the mouth and jaws. This is the work which they will be called upon to perform in the cantonments.

How much actual experience is this department giving their students in the extraction of teeth? In the writer's opinion, instructions in this subject should be given by the head of the department. A definite technic should be taught so that the young dentist will not go about this operation in a haphazard manner. There is no operation that he will be called upon to perform that will so ex-

pose him to discredit as failure in the successful extraction of teeth.

In a recent visit to one of the large cantonments, the writer asked the head of the dental department what he deemed the men in his department were most deficient in. At once he answered "extraction of teeth." He stated that recruits were constantly coming in and that one of the first things that was done was to send them to the dental department for the purpose of extracting old roots and broken down teeth in order to prevent alveolar abscesses and that some of the dentists were absolutely failing in this operation. To some of us this hardly seems possible, yet it is undoubtedly true and such a condition must necessarily reflect upon our teaching. The dental men in this cantonment were representatives from not less than eight of our colleges. We should see to it that in the future our students receive all of the practical experience that it is possible to give them along this line.

The Removal of Impacted Teeth.

This is a very important subject due to the fact that a large number of these anamolies will be found in the mouths of the young men of military age, at which time these conditions become most acute.

A definite technic and post operative treatment relating to this operation should be taught, so that they will be thoroly qualified to handle these cases in the cantonments or in the field. It is very desirable here that they get practical experience in the clinic so that when these cases present, they will be familiar with every phase of the subject.

The large majority of these cases may be operated under conductive anesthesia. The writer believes that this subject can best be taught in the department of oral surgery. It is self evident that a thoro knowledge of anatomy and physiology must precede these instructions. In addition to the regular course in anatomy, the students should receive special instruction in the anatomy of the head and face. In this course the students should be required to make a schematic drawing of the nerve and blood supply of the head. In this manner we feel that this part of the subject becomes more thoroly impressed upon their minds. Here again practical work in the administration of local anesthesia must be given. Each student should have the opportunity of actually doing some of this work and to observe the results. In conductive anesthesia especially, the student cannot become proficient by simply observing the teacher do the work.

In our school the students are permitted to administer conductive anesthesia after they have had the lectures and demonstrations on the subject. I know of no part of the course in which they take a keener interest, than in local anesthesia.

Surgical Treatment of Dento-Alveolar Abscesses.

Our students should be equipped with a knowledge of every phase of this subject. They should be made familiar with the acute and chronic conditions and the proper methods of treatment of each condition. This work can and should be taught didactically and by practical work in the clinics.

It is quite probable that this work will constitute no little part of the practice of the dentist in the service. The students should have a thoro conception of shock. The symptoms, diagnosis and treatment of shock will be valuable knowledge for our men to have.

Our students should be taught the treatment for the control of hemorrhage. The writer knows of no condition in hospital practice where the nurses, and even the young physician becomes more panic stricken than in cases of severe hemorrhage. The surgical technic of ligation of the external carotid, the lingual and the facial arteries should be taught the dental student. While this particular

work will probably have no place in a civil dental practice, yet at this time the writer feels that in the control of primary or secondary hemorrhage this will be valuable knowledge for our men to have.

Gunshot Wounds.

This is a subject which in the past has, in all probability, not been given a great deal of attention in the course in oral surgery for the reason that in a civil dental practice few, if any, cases are ever seen.

However, this is a subject that must be taught now in all of its phases. The student should have a clear conception of the treatment of wounds in general and the complications which may arise, so that when they are confronted with gunshot wounds they will at least have a fundation on which to build. Gunshot wounds in other parts of the body may be demonstrated from time to time in the hospital clinics, and the department of oral surgery should take advantage of these opportunities and have them presented to the dental students.

The departments of pathology and oral surgery should co-operate in the teaching of the subject of gunshot wounds.

Fractures and Dislocations.

At present in the opinion of the writer, the American dentist is deficient in his knowledge of this subject. The reason for this is perhaps due to the fact that comparatively few cases come into a civil dental practice. The student should be taught all of the recognized means for making his diagnosis. The principles in the treatment of fractures should be emphasized to a greater extent than ever before. These principles must be impressed upon the student's mind until they have been fully mastered. Unless this in done the student will be lost when the opportunity presents for him to treat these cases. The relation of muscular strain to the fragments should be thoroly taught. In this connection it is presupposed that the student has had a thoro training in the anatomy of the hard and soft parts of the head.

The process of repair is a part of this teaching that should be given a great deal of attention. The role of the periosteum, also of the compact and medullary portions of the bone in bone regeneration should be carefully studied. In this connection the student should have considerable knowledge on the subject of bone grafting so that he will be more valuable as an operator himself or as an assistant to the oral surgeon.

Complications in the process of repair of fractures is a very important factor for us to teach at this time for practically every fracture of the jaw thru gunshot wound is complicated. That is, every case presents an infected wound, with lacerated arteries, nerves, etc. While in all of these conditions no set rule can be laid down for their treatment, as each will present entirely new problems, yet, if our men understand the principles involved, they will be in a position to handle these cases with credit to themselves and to the profession.

The department of prosthetic dentistry should co-operate in the teaching of the subject of fractures of the jaws. All of the different methods of splinting the jaws should be taught and the student should have an opportunity to make enough of them to get the principles which are involved.

Hospital Knowledge.

How pathetic it sometimes is to see the ignorance displayed by the dentist in hospital knowledge. They actually seem to forget even dental cleanliness, and seem to know little or nothing about surgical cleanliness. Right at this time I believe this department can do a great deal in acquainting our students with the workings of hospital practice. While it is no doubt quite true that but few of the dental men will be assigned to surgical work, yet it is our duty to prepare

these men so as to put them in a position to take advantage of any opportunity that may be offered them.

This teaching can only be done in the hospitals, where the students can come in direct contact with hospital practice and regulations.

The country is now making a call for dental oral surgeons. Can our best graduates of the past, with the training that they have had, fill this important position? The writer feels, if he understands the duties which the dental oral surgeon is expected to fulfill, that extensive and intensive special training should be given to some of these men before they graduate so that when they later enter the special war course of three or four weeks which the government is establishing, they will be better able to comprehend its significance. This perhaps can only be given to a selected few.

When we see the enormous work that has been done by our confreres from Canada, France, England and Italy, on the European battlefields and in the hospitals, we then realize what a tremendous responsibility now confronts the American dentist. The writer feels that much of this responsibility rests upon the colleges today and upon the department of oral surgery in training men for war work. This department can do much to better equip the men to take up these war obligations. This preparation must be given before they leave the colleges, because after that time, unfortunately, they will have little or no opportunity to get it. So our duty lies then in giving the young men just entering the service the best possible preparation in oral surgery, so that they will be amply qualified to do all that will be expected of them as American dentists.

Discussion.

Dr. F. B. Moorehead, Chicago.

There is no more fascinating subject than that of education. The man who is engaged in educational work has the double function of keeping his own soul on fire and of kindling a fire in the soul of his student, and the one is quite as important as the other. The course in dentistry is not designed and should not be used to prepare men to practice oral surgery. We have before us a limited opportunity, limited both in time and in the type of student who comes to us, and the most we can hope for is to give our students an intelligent viewpoint so far as oral surgery is concerned. If we can succeed in giving a perspective to our students, if they may gain a capacity for thought, capacity for observation, capacity for analysis, all of which leads to poise and judgment, we have rendered a service of quality.

We have coming to us in the high school boy with a very limited idea of science, and out of such material it is utterly impossible to undertake a satisfactory course in oral surgery. The medical student with his bachelor of masters degree followed by his four years' of medicine is not qualified to do surgery. Indeed he is scarcely qualified to undertake the studies of surgery on the completion of his medical course, and surely we cannot expect as much of the dental student as we have a right to expect of the medical student.

There are two fairly well defined methods in the presentation of the subject of oral surgery; the one is to teach fundamental principles, giving the student a ground work leading him to think and analyze data, and the other is to drill him after a more or less mechanical fashion in things which are to him fundamentally meaningless. Unless a man learns the principles of biology he can never do satisfactory surgery. Unless the student learns to receive and analyze he can never hope to grow, and unless our educational process is designed to that end, we are not doing the right kind of work.

The function of the dentist in military life is more or less well defined under

two heads: first the dentist who will render dental service pure and simple, extracting teeth and saving others by mechanical means; second, the man who will be assigned to base hospital activities and who will be more or less qualified to assist the plastic and head surgeon in surgery of the mouth and jaws, and who will doubtless be expected to manage cases of fracture and the like. It is for this second group of men that the division of head and plastic surgery are conducting courses in various centers.

These are untoward times, and Dr. Lyons is quite right in asking us, as far as it is consistent with the interests of the dental student in his future quality, to emphasize those things that will best prepare him for military service. Dr. Lyons emphasizes the extraction of teeth, and the extraction of teeth is a fundamental and surgical procedure. Just because this particular line of work has been done in a sloppy fashion in most of our institutions and done as a routine affair, many times without instruction, does not alter the facts one iota. The extraction of a tooth should be surrounded with all the safeguards which are necessary when the continuity of tissue is broken in any part of the body. The opening of tissue any place is always accompanied by a certain amount of danger. It is not a simple matter to give the dental student in his senior year an opportunity to extract teeth. I have thought about this question a great deal, and have never arrived at any conclusion which satisfies the needs of the student. The fact of the matter is, we are undertaking a type of service which is not given anywhere else in medicine. The medical student does not do surgery, nor does he do obstetrics except in a limited way and with a trained instructor managing the job.

In the University of Illinois we have an extracting clinic which is well organized with a competent surgical nurse in charge of the details. Students are assigned in groups of four and they report in the department one-half hour before the clinic begins. During this half hour the surgical nurse in charge reviews briefly the important points in technic, emphasizing surgical cleanliness, how it may be secured and maintained. During the clinic the students assist in the administration of nitrous oxide and oxygen, in the sterilizing of instruments and in general clinic routine. Each group has an initial training of twelve hours. In the rotation of the class the second time the group apears, the students undertake the simpler forms of extracting. How much further than that is safe or wise for students to go in the extraction of teeth, I do not know. I wish Dr. Lyons would tell us to what extent students extract teeth in the University of Michigan. Extracting teeth is a difficult operation, some times one of the most difficult. No man should undertake to extract a tooth who is not prepared to meet every emergency that may develop in the operation. The fellow who breaks off a tooth and is unable to get out the remaining portion of the root, or if he does remove it mutilates the patient's jaw, is not competent to extract teeth at all.

As I stated a moment ago, these are untoward times, and I suppose we are justified in going out of the beaten path even to extremes if by these means we can render a better type of service during the present war period.

I am delighted to know that there is to be a course of instruction for the members of the Dental Reserve Corps at Fort Oglethorpe. I have been sorry more than once that we have not given our dentists the same opportunity that has been given the medical men in the cantonments. For example, Dr. John Ridlon of Chicago, who with two or three equally well trained orthopedic surgeons has been giving his entire time visiting the cantonments and giving courses to the medical corps on the recognition and care of foot lesions. The same sort of work has been done by the

eye men and the skin men. It is too bad that the man who is going to take care of the mouths of our soldiers does not have the same opportunity that the other specialists do. I think it is pertinent to say a word about the type of man who is going into the dental service of the army. I have three nephews already in service, two of them in France, and I want for those boys the finest that medicine can afford, whether in the care of their eyes or their teeth or their general physical interests. As an American citizen I should not want anything for my own that I would not want for every other American boy. There is nothing too good for the soldier, and I do not care whether he has gone out cheerfully with a fine quality of patriotism answering the call of his country, or whether he has gone after the government has placed the arm of authority on him and bidden him go. I do not care whether the one or the other, but because of the fact that he is giving his last ounce of service to his country in your protection and in my protection, the least we can do for him is to see to it that he is surrounded with everything that medical science affords, that his life and health shall be safeguarded in every possible way, and that in the extremity of disaster nothing is left undone in the way of restoring him to as near a physically perfect man as possible.

Dr. Hugh W. MacMillan, Cincinnati.

The paper of Dr. Lyons has so emphasized the ideals of our present day dentistry that a discussion can only call forth the greatest commendation. The profession of dentistry is to pass thru its most severe tests within the next two years. It is our great obligation, since most of us are unable to go to the front, to so prepare the young men who are going that they will be equipped in the knowledge of those things which the profession has been selected to perform.

It seems that a description of methods would best answer the requirements of a discussion of this paper. In the course of oral surgery and anesthetics at the Ohio College of Dental Surgery, a syllabus of the course has been arranged. At each lecture a sheet outlining the subject of the next lecture and containing several practical questions on the subject is distributed to each student. This is filed in the note-book and is supposed to be written up. The lecture then generally consists of discussions of certain points in the outline, blackboard drawings or lantern slide demonstrations, and a quiz. An opportunity is given to every student to have explained every point on which he is in doubt after he has made an attempt to find it in references.

The clinical part of the course brings the student into actual contact with cases simulating war surgery. The class is divided into sections and taken to the Cincinnati General Hospital where operations are performed before them in the Dental Department. The great variety of cases presented including fractured jaws (of which there is usually a dozen cases being treated at one time), gunshot wounds, osteomyelitis, cysts, necrosis, and difficult extractions. By limiting the number of men to a section, individual attention can be given to each student who thereby comes into sufficiently close contact with these cases to apply the knowledge thereby gained to good advantage afterwards.

The hospital course also affords an ideal method of teaching anesthesia. Each modern anesthetic is given before the section and the different stages of anesthesia explained. Lectures and quizzes round out the course. There is also an opportunity for practicing dentists contemplating war work to take a course in anesthesia at the hospital, administering chloroform, ether, ethyl chloride, intratrachyeal anesthesia, and nitrous oxide and oxygen, for the major surgical operations as well as for the mouth operations.

The greatest value of a course of this kind given in a hospital is that it gives the student an opportunity to observe sterilizing technic and aseptic methods. Most dental colleges are woefully deficient in practicing strict asepsis even in the departments where it can be easily accomplished. By seeing things done correctly in the hospital the student will carry an ideal with him when he fits up his office or if he goes into a base hospital he will have already observed the routine procedures which will be of inestimable benefit to him.

The "bit" of the teachers of oral surgery will be amplified into a magnificent service if his students are so prepared that they are capable of the great responsibilites which they are undertaking. In no better way can he more thoroly qualify himself than to follow the principles which Dr. Lyons has clearly elucidated.

Dr. S. L. McCurdy, Pittsburgh.

Dr. Lyons' paper is so extensive in its consideration of various problems that it will be impossible for me to consider the dental phases of the subject. In the manuscript I read as follows: "The process of repair is a part of this teaching that should be given a great deal of attention. The role of the periosteum, also that of the compact and medullary part of the bone, should be carefully studied. In this connection the student should have a considerable knowledge of the subject of bone grafting so that he will be most valuable as an operator himself and as an assistant to the surgeon."

The mandible after the removal of the alveolar process is histologically a long bone with all of the functions, so far as regeneration, repair, etc., are concerned. Flat bones have power to regenerate from the margin only, and that to a very slight degree.

A fundamental principle of repair is that tissue to be repaired or regenerated must be regenerated by the variety of cell characteristic of that tissue; i. e., nerve cells can not develop bone, neither can muscle cells develop nerves, etc.

If we accept the law laid down by Macewen in his new work on bone repair and regeneration, we find that the periosteum has no place in performing this function, but that bone can only grow where there are osteogenetic cells. As proof of this law I desire to show several lantern slides. The first picture is that of an osteomyelitis of the tibia, operated before the appearance of Macewen's books, at which time we were taught to remove dead bone, or bone which did not have attached to it periosteum, for the reason that it was a foreign body; this operation was done. The second picture shows that after a period of a year there was no regeneration, except that at the lower end of the upper fragment near the knee nature was pushing off a conical piece of bone that had grown about an inch long. As you will observe, there is none developing above the astragalus or thruout the entire length of the bone. The third picture shows a six and one-half inch graft with the beginning development of bone. The fourth picture shows that the graft has been converted into new bone, a smooth. cylindrical, regenerated tibia.

The second case is of practically the same nature, where the entire tibia had been removed and after many months there was no regeneration, as will be seen. In the next picture you will observe that I have grafted eight and one-half inches of bone from the other tibia. The third picture shows a great amount of regeneration, and the fourth shows that we have practically a new bone regenerated, and that the graft which furnished the osteogenetic cells for the regeneration is rapidly melting away and will entirely disappear, disproving any idea that the graft becomes a part of the new bone en masse. You will observe on the lower end of the graft that the new bone has melted down in toward the ankle for two or three inches.

The next case is one treated with the light furnished in the experience of the first case, a boy with an osteomyelitis of the entire tibia, as will be shown in the slide now shown (a). The method of treating this case was to split the periosteum and soft tissues wide open from near the knee to near the ankle, allowing the dead bone to be exposed. This was kept sterile by the use of normal salt dressings over a period of five months. B and C show the extent of regeneration of bone around the sequestrum. At this time the sequestrum was removed and the tubular regenerated bone along the anterior margins were broken down and pushed into the cavity from which the sequestrum had been removed, permitting the soft tissues to be sutured together along the entire length of the incision. The next picture shows what was finally obtained a year later. You will observe what a perfectly formed tibia was secured, equally as strong as it was before the disease, and almost as perfectly shaped.

Remembering Wolff's law, which is that bone or other tissues regenerate in proportion to the demands made upon repairing tissues for increased material, pressure upon a bone does not atrophy it but causes it to grow. From the foregoing I believe you will agree with me that the periosteum has nothing to do with the development of bone any more than the skin. The osteogenetic power of the periosteum is an idea of by-gone days.

Dr. T. W. Brophy, Chicago.

I have occasion to feel very happy over the discussion that has taken place here this evening. It makes me think that I am getting along a little in life when I come to a meeting and listen to the reading of a paper by one who was my student, and that paper discussed by one who was my student. A paper and a discussion of a high order. It certainly makes me feel that I have done some good in the world.

I will not say very much regarding the subject, more than this: The teaching of oral surgery is like the teaching of any other kind of surgery; no man ever taught oral surgery so as to make it practical by didactic lectures. No man ever taught surgery thoroly to one who has done only anatomical work in the dissecting room. The man who succeeds in surgery is the one who learns his descriptive anatomy and learns it well, and then, having learned it, operates time and time again on the cadaver and becomes familiar with the relation of the parts. You cannot learn the relation of parts by hearing some one go over them, any more than I could teach you all how to play the violin by delivering a lecture on how it should be done. The man must do the work himself and he must be guided by one who thoroly understands how to do it. To learn surgery well a man must do it in the presence of the master, otherwise his mistakes will be many.

With reference to pathology and to biology, the histological development of tissue, I believe with Dr. McCurdy that the sequestrum of bone should be left. I think Dr. Moorehead will remember how, when he was a student, we developed an entire mandible in a man who had a complete necrosis of that bone. I refused to remove it, but kept it irrigated well until osteoclasts developed a new mandible, and then later he had an artificial denture made which fitted over it nicely so he got along well.

Of course, loss of the mandible means a deplorable damage by loss of the soft part and shrinking and loss of the symphysis. To preserve facial contour is a matter of great importance. If I had opportunity I would tell all the boys going to the front that whenever a mandible is necrotic to retain it until the osteoclasts make new bone. The osteogenetic powers that are remaining in the cells which are in contact with the periosteum will develop new bone. How often have I developed a complete hard

palate to extend over the fissure, by carrying up the periosteum along with sufficient bone cells to lead to the regeneration of other bones, thus securing a perfect hard palate. And so in the regeneration of other bones, as the mandible, I cannot agree with Dr. McCurdy when he says that the maxilla cannot in some measure be regenerated, for we have done it in the case of large perforations. We sometimes restore the antrum walls. By lifting away the periosteum and with it some of the osteoclasts, and making button-shaped openings thru the canine fossa and after the empyemia of the antrum has been cured, in the course of time, new bone will regenerate and the opening will be closed.

In the case of regeneration of bone, it is not within the power of the Roentgen photograph to determine whether bone exists or not. Usually not within eight or ten months after union is complete can you discover it by the use of the Roentgen photograph. It will show nothing, because the bone is not sufficiently ossified to give the same appearance as the original bone. The new bone is not visible until ossification is complete.

Dr. Lyons: I want to take just a few minutes in answering one or two questions that have been brought up.

It is true, as Dr. Moorhead states, that we cannot make oral surgeons out of our dental students, yet at this time we are laboring under extraordinary conditions, and while we cannot make oral surgeons out of dental students we can at least acquaint them with the technic of certain operations that they may be called upon to perform at this time. Without that knowledge they will be entirely lost, they will know nothing about it; with it, they will be either better operators themselves or better assistants. No doubt many of our men will be assistants to oral surgeons, and if they have specific knowledge of some of the points mentioned in my paper they will be better assistants. It is our duty to train them along those specific lines even tho we miss some of the technical training. I feel that it is very important for our graduates going out this year and possibly next year and the years during the war, to familiarize themselves with some of these specific things. They may not be as good technicians as they would be with more extensive training along those lines yet they can become proficient in technical work after they come back. If they do not get this work now they will not have it. If they go to the cantonments without this course, unless the special course the Government establishes gives it to them, they will not have the prestige they have had in the past, for already our confreres in other countries are doing this work. We do not want to send our men over there and have the report come back that the American dentist has not made good.

The question came up regarding extraction. Dr. Brophy has stated in connection with oral surgery that in order for a man to do the work properly he must have done it himself. I feel the same about extraction. I doubt not there are men in this room who went away from the dental college without any experience in extraction. At Ann Arbor we do not have as large a clinic perhaps as have the schools in Chicago and Pittsburgh, yet during the course of the year we extract there between 2,000 and 2,500 teeth, and these teeth are all extracted by the students. Sometimes they fail, but there isn't a tooth extracted except in the presence of myself or my assistant. We direct the work and show the student how to use the forceps, and after he has removed a few teeth he will do it easier. Each student extracts from 25 to 50 teeth in a year. They are all required to take out a certain number of teeth as part of their requirements before graduation. While we cannot give them as extensive ex-

perience as some of the other schools can in this work, yet we feel that they must as far as possible have that practical experience themselves. You cannot tell the boy sitting in the amphitheatre how to extract a tooth and expect him to do it; he has to actually do the work.

WAR PROSTHESIS.

By Joseph Nolin, D. D. S., Montreal.

WHEN the writer of this paper received an invitation—which under war conditions amounted to an order—to prepare an essay on "War Prosthesis, *with a view of delineating a short course for senior students, during the second term of each year,*" he gasped at the enormity of the task. Tho the short meetings of the American Institute of Dental Teachers call for brief papers, it is nevertheless expected, of essayists, that they lay down all the fundamental principles of the subject under study, and show the most simple methods by which they may be presented to students. Anxious, however, to do his bit for the welfare of those who risk their lives for the sake of our liberties, he undertook the task willingly, and he makes no other apology for such faults as may be found in this essay than that the time at his disposal was too limited to allow him to do better.

Three years of war have opened new and everchanging fields of research in dental prosthesis, and the bringing down to fundamentals of such advancements as have been accomplished so far, necessitated the re-reading of and re-digestng of hundreds of pages, the noting of many serious suggestions, the grasping of ideas (often well conceived but imperfectly rendered, or vice versa, by speech or illustration), and the careful elimination of frills and fads, which, less than anywhere else, can be tolerated for a moment, in a field so pregnant with dangerous, or even fatal complications.

War Prosthesis may be divided into three distinct fields of research.

1. The ANTE BELLUM field, or ordinary dental prosthesis as applied to the otherwise healthy soldier, going into or during his stay in the field.

2. The BELLUM field, which treats of such help as the dental prothesist may be called upon to offer to the oral surgeon while the wounded soldier is under treatment.

3. The POST BELLUM field, or restorative prosthesis, which *treats* of the restoration by prosthetic means of the functions and the tissues of the maxillary bones, as well as of the exterior esthetic aspect of the face, lost thru wounds received at war or thru the subsequent treatment of such wounds.

Ordinary Dental Prosthesis as Applied to Soldiers in Active Service.

Considered superficially, this field of endeavor does not seem to call for any special attainment on the part of the dental prothesist, other than those necessary in ordinary practice. Thoughtful consideration will show, however, that conditions which must prove to be different, both for dentist and for patient, call for more complete and effective preparedness on the part of the former.

The dentist must be ready to do the largest amount of work within a stated period of time and in as few sittings as can be made compatible with effectiveness. This is especially true for mem-

bers of the Army Dental Corps, when on duty in concentration camps, at home or abroad. Military units keep coming and going, and the prothesist never knows how long a particular patient may remain in the vicinity of his establishment.

I have been told that the number of undelivered plates and bridges in some Army Dental Corps establishments, in Europe, would be a delight for dealers in scrap-gold and second hand false teeth.

This drawback could easily be overcome by teaching fourth year students how to take both an accurate impression and an accurate plastic bite at one and the same sitting and to adjust the finished plate at the next.

The number of sittings for bridges and crowns can also be made fewer by preparing abutments, making crowns and taking impressions at the one sitting.

Not only should prosthetic work for soldiers on duty be *quickly* made, but it should above all be *serviceable.* The military dentist must stretch his code of ethics even to the point of sacrificing, not only esthetics, but even all *doubtful* teeth which, under other circumstances, he has been taught to endeavor to preserve.

Effectiveness of mastication, easiness of repair, durability and strength should be uppermost in the dentist's mind when making prosthetic work for the soldiers. He should remember that soldiers at the front may be weeks and even months away from all dental help, so that all complicated and delicate dental apparatus, such for instance as Shay's or Gilmore attachments, thin bridges with Steel facings, etc., may often prove more of a hindrance than a help.

In France where the private soldier's five cents a day pay, debars him from paid dental service, and where the Government is not over lavish with funds for the Dental Army service, dentists have found a very ingenious way of combining strength, effectiveness and cheapness by substituting vulcanite to porcelain and a nickel composition for platinized gold, for the clasps of partial plates. I have here a few sample cases of partial plates which are duplicates of cases now in use in the French Army and which have given satisfaction.

A Field Motor Dental Laboratory, used as an auxiliary to the Field Dental Motor Ambulance, is also a French invention which deserved better recognition by the military authorities over there, and of which the American Army Dental Corps may be able to make effective use.

It will be seen later on in this paper that Dental Educators owe the French Dental Profession, the last to be recognized by its national military authorities, a great debt of gratitude for what it has so far accomplished in the line of War Oral Surgery and War Prosthesis.

It is possible that this very lack of early recognition may have been the indirect cause of many precious discoveries, inasmuch as (most dentists of military age being drafted for the front as fighters) dental service for the army had to be taken up voluntarily by the older men, mostly dental school professors, who made it a labor of love and devotion. It opened this line of research to the best mental efforts of such men as Godon, d' Argent, Villain, Roy, Blaeter, Martinier, Choquet, etc., etc., who found in it a fertile field for their highly trained minds, as well as solace to their sorrows.

Bellum or Actual War Prosthesis.

As early as 1870 some dentists, led by Peter and Delalian, had begun to work in conjunction with military surgeons to help in the setting, retention and restoration of maxillary and mandibular war fractures.

"The many discoveries made in surgical and restorative prosthesis since 1870, says Dr. Paul Martinier, (Congres Dentaire Inter-Aliés Nov., 1916), made it imperative for us to do better, and modern methods have made it possible for our interventions to be more

immediate and, consequently, more effective than heretofore. It is now an accepted fact that the immediate intervention of the dental prothesist in most cases of maxilliary Traumatism, and his constant collaboration with the surgeon, is essential for the obtaining of satisfactory results."

Materials Used in War Prosthesis.

It is now considered that plaster alone guarantees an exact reproduction of cases under treatment. No other material is as trustworthy for this class of work. If we except gold and platinum, which can be used but exceptionally on account of their excessive cost, we may say that silver, aluminum, tin, nickel silver and "Victoria" metal have frequently been used with success for "all-metal" appliances. Most French prothesists seem to prefer silver for all cast work. This metal, however, cannot conveniently be used in conjunction with rubber. Aluminum and its alloys as well as nickel have been used with success in combination with vulcanite, which, in its hard, soft or medium state, is often found most useful.

Classification of Appliances.[1]

Appliances which can be made by the dental prothesist to help the surgeon in the treatment of fractures of mandible and maxilla may be divided into two principal proups: *Reduction* or *bone setting* appliances, and *Retaining* appliances.

Setting or reducing appliances are those used to force into their proper relations to each other, fragments of broken bones.

Retaining appliances are to render immovable the broken fragments, after they have been set in their proper places until the completion of reossification.

[1]This classification is taken from a paper by Dr. Martinier in l' Odontologie.

Fractures of the Lower Maxillary Bone Setting Appliances.

Setting appliances for the mandibular fractures may be: Mono-Maxillary, Inter-Maxillary or Cranio-Maxillary.

Mono-Maxilliary appliances are mostly *intra-buccal.* They are attached to the teeth and resemble an orthodontia apparatus. They are made to produce *force* which may be *continuous, intermittent* or *composite.* Such force is obtained from springs. rubber bands, jacks, ligatures, etc. In *Inter-Maxilliary* appliances; as the name implies: the appliance is attached to both jaws, one of which is used as a fulcrum to draw or push the broken bone and teeth of the other into their proper places.

Cranio-Maxillary appliances resemble those used by orthodontists when correcting a prognathous lower jaw.

Retaining Appliances.

Retaining Appliances for the mandible are divided into three classes: 1. Those which produce *Immediate Retention* and which are applied to cases where the setting of fragments can be immediate. They may be: *External,* such as sub-maxillary splints in conjunction with cranial bandages, *Bucco-External,* such as Splints, (Delair's, Rigley's, etc.,) or *Mono-Maxillary* (intra-buccal), such as inter-dental splints of all kinds, etc.

2. Retention may also be had by the apparatus from which the reduction of the fracture has previously been obtained; these are mostly intra-buccal, and inter-maxillary. They consist of a combination of inter-dental splints, rods, cranks, etc., and they form the most interesting group to be studied in this paper. It is with this class of appliances that a number of French dentists such as Drs. Martinier, Villain, Roy, Frey, Choquet, and others have worked wonders. This you may better be able to appreciate when photographs

of some cases treated by them are thrown on the screen.

3. Retention may also be obtained by immobilization of the temporo-maxillary articulation. For this *Inter-maxillary* Intra-buccal appliances are used, such as Gunning splints or Independent Superior and Inferior mono-maxillary splints ligated to each other.

FRACTURE OF THE UPPER-MAXILLIARY —REDUCTION APPLIANCES.

SETTING APPLIANCES for fractures of the superior maxillary bone are MONO-MAXILLARY and mostly INTRA-BUCCAL. The force used may be continuous or intermittent as the case may suggest.

RETAINING APPLIANCES used for the superior maxillary are either *mono-maxillary* or *cranio-maxillary.*

Fractures of the Superior Maxillary bone do not call for such complicated apparatus as those of the lower jaw and need no elaborate discussion, as any ordinary prosthesist or orthodontist may well be able to handle them.

The main point to be considered and which can not be over estimated in the treatment of both upper and lower fractures is that the intervention of the dental prosthesist should be immediate. This calls for the presence, at least in all hospitals at the front, of dental prothesists versed in all the secrets of the manufacture of modern appliances for the setting and retention of fractured maxillary bones, such as may be found today in the two Canadian hospitals of St. Cloud and Joinville.

RESTORATIVE PROSTHESIS.

POST BELLUM OR RESTORATIVE PROSTHESISTS is divided into EXTERNAL Restorative Prothesis and INTERNAL Restorative Prosthesis. The latter consists of appliances used to replace missing portions of bone and which are left permanently in place and imbeded in living tissue.

EXTERNAL RESTORATIVE PROSTHESIS.

EXTERNAL RESTORATIVE PROSTHESIS, as the name implies is the art,

1. Of restoring to their primitive shape such portions of the face as have been or might be, deformed by wounds, surgical intervention, and faulty formation of cicatrical tissue.

2. Of temporarily consolidating broken lower maxillaries for the correction of faulty consolidation or of making appliances to be used as a frame-work for plastic surgery.

3. Of the combined restoration of lost bone tissue along with all or some of the teeth.

4. Of plastic artificial restoration of parts of the face, nose, ears, lips, etc.

REDUCTION OF CICATRICIAL TISSUES.

Altho it is always preferable that the intervention of the prothesist should come in conjunction with that of the surgeon, it will be found that, in practice, hundreds and thousands of cases will come under his notice only after the healing process is almost complete. On the arrival of such cases at the base hospital it is often found that further surgical or prosthetic intervention is essential if the patient is not to be maimed or disfigured for life.

The reduction of cicatrical tissue may then be obtained thru *Bloodless* or *Prosthetic Reduction* or, again by the help of *Surgico-Prosthetic*-Reduction.

Bloodless Reduction can be obtained by using different special pressure-giving appliances which tend to stretch the newly formed tissue and remold it to its proper shape. The nature of the pressure which should be used is indicated by the case in hand, and one may chose one of the following: pressure by weight, pressure by volume, pressure by springs and pressure by superimposed vulcanite plates.

In the *Surgico-Prosthetic* reduction of cicatricial tissue the prosthesist is called upon to construct appliances around

which the plastic surgeon will stretch and reshape the deformed tissue. These appliances may be totally removable, or only partly so, with a possible gradual increase in volume.

Temporary Ante-Operative Squelletic Prosthesis of Lower Maxillary. Bone.

In a great many cases, fractures of the lower maxillaries will leave after them imperfections more or less important, which may call for the reintervention of both surgeon and prosthesist. Again, the prosthetic intervention may be *Bloodless* or *Surgical.*

Faulty consolidation may be corrected *Bloodlessly* by the aid of ordinary orthodontia appliances, splints, jacks, rods, etc. Appliances on the other hand, which are used as mere auxiliaries for the intervention of the plastic surgeon are of two kinds: *Removable* and *amovo-permanent.* The removable kind, are held in place by the ordinary means of clasps, bands, etc. Whereas the *amovo-permanent* appliances are of a dull nature, one part being attached to the broken bone and the other, made of vulcanite, is detachable and may be modified at will.

Permanent Combined Squelletic and Dental Restorations.

Appliances for these are of three classes: *Removable, Amovo-permanent* and *Permanent.* The *Removable* squelletic restoration apparatus consists of rubber or light metal, and more or less bulky. It is made to replace missing parts of the maxillary bones and soft tissue. Few of them are of very recent design and they are built on the old lines of cleft-palate obturators. Of the amovo-permanent double appliances one part is permanently attached to the maxillary bone and supports the other which is locked on to it.

Permanent Restoration is Obtained by Modified Bridge-Work Cemented to the Teeth.

Plastic Prosthesis.

It is an acknowledged fact that the proportion of soldiers wounded in the head, face and neck is much greater in this war than any other war in History. During the first year of the war the number of disabled men, disfigured by lesions of the tissues of the face were so numerous in French cities that the morals of the army and the people were notably affected by them.

Thousands of men going thru the streets with missing noses, ears, cheeks or lips, became a nightmare. Something had to be quickly done and a remedy to be found. French genius and French imagination were called upon to solve this new problem. Here was another field for dental prosthesis and it proved itself equal to the task. The unfortunate men were first asked to keep away from the pitying gaze of the public. To this new sacrifice they all willingly acceded, for the welfare and salvation of their beloved France.

The intervention of the plastic surgeon and the dental prosthesists were called for and willingly given. In a large proportion of cases the plastic surgeon could do little and the prothesist was left to his own resources. Old methods of facial restoration in wax or rubber were clumsy and slow of construction. Fortunately, just previous to the war a new mode of facial prosthesis had been discovered, called the Henning Process. It had been, at the beginning of 1914 presented to the Société d' Odontologie of Paris by Dr. Wornekross. Dr. 'Pont, of Lyon, had also, on April 7th, 1914, presented to the same society thru Dr. P Martinier the report of a case treated by him by the same system.

The material used is a plastic composition of which your essayist has not been able, but soon hopes, to get the formula. It has the consistency and even

the feel of the human flesh. It can be easily melted and poured into a mold, which remains intact, so that the artificial nose or ear may be reproduced indefinitely. It is permanently colored so as to resemble human flesh in a most wonderful way, and as it is very light it can be attached to the skin with the same ease and with the same adhesive material as the artificial beards used by actors or detectives.

Internal Prosthesis.

Internal Prosthesis is the study of appliances which are attached permanently to the bone and which are destined to be covered with living tissue.

This field of prosthetic science is still in the experimental stages and would call for a paper longer than this essay which has already overtaxed your patience and which your essayist hastens to conclude, begging your indulgence for its dryness and many limitations. If it can be found of use by dental teachers in delineating a course of war prosthesis to help future members of the American Army Dental Corps in their task of relieving human suffering, he will be more than amply repaid for his work and his trouble.

Discussion.

Dr. A. W. Thornton, Montreal.

The paper which Dr. Nolin has presented is remarkable in many ways, but particularly so in this: That every day in the year he does all his teaching in French. And perhaps I do not need to tell you that on the subject of English Dr. Nolin is one of the best posted men in Montreal. I feel, however, that he has experienced a little diffidence in reading his paper in English, but you will find him not so diffident in talking English.

Dr. E. H. Mauk, San Francisco.

I am glad that this tribute has been given to Dr. Nolin for his bravery and self-sacrifice in addressing us in a language which must be more or less foreign to him. I consider it a notable achievement on his part. The lateness of the hour and the fact that the paper was not available until four o'clock today, preclude any extended discussion. This is very unfortunate it seems to me, inasmuch as, in my estimation, the subject takes equal rank in interest at this time with oral surgery. The oral surgeon must often look to the prosthesist to finish what he has begun, and this is true not alone in war surgery, but is often true in civil surgery. When we think of the frightful injuries inflicted and see some of the remarkable results achieved, we cannot fail to give unstinted admiration for the ingenuity and self-sacrifice and devotion of the French dentists who, marshaling all their accomplishments in coming forward to meet these emergencies, deserve our highest praise.

As teachers we must all be impressed with the fact that no conditions in civil life afford a comprehensive basis on which to build a course for the war prosthesist. It seems that the best we can do is to be sure that our men who are going forward are thoroly grounded in technic, in the use of materials and in the application of all sorts of force, and also trained in the ability to accommodate themselves to conditions. They must be not only prosthesists, but artists and orthodontists, as well. They have to be able to work under all sorts of bad condition. In other words, they have to be men of training and experience and great resourcefulness. That is about all we can do, and then send our men forward to get their final training from those who have been in actual contact with these wounded men at the front and in the base hospitals. I believe that under those conditions we can depend on American ingenuity and resourcefulness to render a good account in their services. The more material we can have access to, such as Dr. Nolin has shown us in the way of splints, pressure apparatus,

etc., the more we will be able to shorten the training time necessary after our men get to the front. It might be supposed that Canada offers a better field for training along this line than does the United States, due to the greater length of time that country has been in the war and the large number of men sent back, but Dr. Nolin tells me that this is only partially true.

I think that the interest manifested in this paper is sufficient, and I feel that you are all more anxious to get to the inspection of the models shown by Dr. Nolin than to listen to further discussion on my part. I want to again extend my tribute to Dr. Nolin for what we have been shown, and voice our appreciation.

Dr. S. H. Guilford, Philadelphia.

I had the pleasure of reading Dr. Nolin's paper on the train coming in, and later I saw some of his specimens, photographs, cuts, etc., and had the benefit of his explanation of them. I think we will all agree that he has shown a wonderful amount of diligence and expended a great deal of labor in preparation.

In regard to his statements with reference to war surgery, with most of those I think we can agree, but there are some other things in regard to which we can be allowed to differ with him. In the first place, this war has brought about a wonderful change in that part of dental practice pertaining to war surgery. Before this war was started we had very little knowledge of the proper treatment of fractures in general, and when we had cases of the kind to treat they only occurred here and there in connection with an explosion, a kick by a horse, bad falls, and accidents of that kind. But as a rule the lesions were not extensive. So when dentists were called into hospitals and saw injuries of the face, etc., connected with the war, they were without experience and the work relative thereto had to be developed from the ground up. I know something of this because in the summer of 1915 I had the pleasure of taking a unit of four men to Paris to assist in an ambulance hospital. In that unit were an oral surgeon, a prosthesist and two general practitioners. We served during three months of the summer. It was not what we did there, but what we learned that was of benefit to us. In that ambulance or hospital they had two fully equipped large dental offices and between them a dental laboratory. We had ten operating chairs and in the laboratory we had eight men. Here is the important part that has never been attended to in this country, possibly because we have not had the need of it. We have not recognized the capability of the dental laboratory man in making these appliances, but we should remember that he is fully qualified to construct them for he is constantly engaged in construction work. In France it is a separate occupation and these men are called mechanicians. They have little shops and do work just as our dental laboratories do. They take boys and train them thru young manhood and up to middle age to do this work, and they do nothing else. They not only do what they are taught, but they often do original work and produce wonderful results. The French Government found that in the different hospitals they did not have enough laboratory men, and the proper officer of the Government said: "We want more dental mechanicians," so these men were sent back from the front to the hospitals to do this special work and were under Government control.

Therefore, with ten operators in the ambulance, there were eight mechanicians at work making the needed appliances. The operator knew what was needed, took the impression and did the fitting, but the laboratory man made the model from the impression and constructed the appliances and got them ready to be placed in the mouth. That was a wonderful help.

At the present time we have nothing of that kind. We are sending men abroad to work in the hospitals and they are obliged to make their own appliances. In other words, they are not only operating upon the patient, but making their own appliances. They should not be required to do this. We should provide mechanical dentists to do this work. Possibly we will come to realize this necessity soon, when matters will be rectified.

In Canada they have reached this point because wounded men have come home. Wounded men will be coming to this country before long, and so I am pleased to know of the establishment of training schools here. It does not do any good to send dentists to work with the wounded if they have to be worked to death. They should be trained before they go over, or they should be placed on the other side and trained there. They must have special training for their work. In the United States, at the present time the training that is being done in this special line, for instance in St. Louis and Chicago, is carried on in courses covering a period of three weeks. But what can one teach in that time as to making the war appliances that are necessary. Three months is not too long a time. Therefore in training men we should have places where they can go and be properly instructed. If the Government has established these training camps in order that dentists may be qualified to go to the other side or serve here, then we can get valuable assistance from the men who have done this work. We have men in France like Dr. Valadier, who is an American graduate, and Dr. Choquet, 60 years of age, a splendid dentist with excellent ideas, a teacher in the French school and he was working there. Also have Dr. Hayes and Dr. Davenport. If our Government wants to do this work, let it have men come from there to teach and train our men along this line, or let our men go to the other side and get the training.

As I said in the beginning, the wonderful ingenuity that has been displayed by dental practitioners connected with war activity, as shown by Dr. Nolin in his illustrations, is worthy of our deepest admiration. It is an indication of what dentists are capable of doing, of what a mechanically trained mind and hand are capable of developing. These are the things that we will all probably need soon. I hope our Government will take such action as will allow us to work these matters out well.

Dr. H. W. Morgan, Nashville.

I wish to compliment the essayist on what he has been able to show us, and to say that I hope that in some way the matter that has been exhibited by him may be illustrated in our transactions. In this connection I would suggest that in the order for the transactions this year we ought at least to incorporate all these papers and get out a sufficiently large edition to enable us to place a copy in the hands of every dental surgeon connected with our Army. Let them have this information that has been gathered for them, let them get it directly from this Institute.

I take the liberty of correcting Dr. Guilford in one particular: There are provisions made for dental assistants in the Army. Each of the Reserve Corps has the right to select an assistant, and they are breaking up the dental conscription age who are associated with a dental surgeon. They are doing just that thing. We have in Nashville only one laboratory and have had it for about two years, and they have two of the three men comprising its personnel in Camp Pike, Ark., and the third man at Camp Gordon, Ga. They are associated with the young men at Vanderbilt and met them in Nashville. These technicians should be in the base hospitals, they are needed there more than in the Army. The detail officer in the regiment has no pro-

visions for any prosthetic work of any character. These men are with the ambulances, but not in the Corps.

I have occasion to know Dr. Guilford is also somewhat in error with reference to the three or four weeks' course of training that has been given in St. Louis and Chicago. That work is not given solely to dentists; it has been the combination of the surgeon and the dentist, which is going to bring about an altogether different relationship between the two professions hereafter. In those base hospitals they do not expect to confine the dentist to this special field; he is to be at the elbow of the surgeon, and whenever and wherever they can render assistance they are going to be called upon to do it. Therefore their presence there is not merely for the purpose of discharging the duties incident to the dental profession.

Dr. Guilford: *I would say that that* was done in France two years ago; that is to say, the surgeons of the hospital frequently called a dentist from his chair to come in and consult over cases, and whenever the dentist wanted consultation with the surgeon the surgeon came to the dental chair and consulted with him. We were in constant consultation there every day.

Dr. Morgan: I am glad that the heads of our base hospitals are realizing the value of this cooperation between surgeon and dentist.

Dr. A. W. Thornton: You older men will remember the words, "The period of reconstruction." We are now passing thru that period. There has been established under Government control what is called vocational training in all the large cities of Canada. Thru this instruction we are giving the men a new start. Just the day before coming here I received a letter from Dr. McEwen, and he wants the dental schools or some agency to teach these returned soldiers mechanical dentistry, as many of them have mechanical ability. And so some of these men will construct appliances for their wounded brother soldiers, and they will at the same time be enabled to make a good living, as the Government pays them for eight months while learning this new work.

PROPOSED PLAN FOR PUBLISHING AN INDEX OF DENTAL LITERATURE

UNDER THE AUSPICES OF THE AMERICAN INSTITUTE OF DENTAL TEACHERS.

Arthur D. Black, A. M., M. D., D. D. S.

IT HAS now been ten years since the matter of indexing the current dental literature was taken up by this organization. The difficulties presented have been many, and I know there has been considerable disappointment in the minds of several who have been interested in this work, that it has not progressed more rapidly.

We attempted a number of times to develop the work of indexing by dentists. We failed every time because of the fact that about as soon as they had mastered the difficulties of this work, other things piled upon them, and it was really impracticable for them to continue indexing. I mean no criticism whatever of the various men who have undertaken to help; it is a statement that will apply to all of us—it is too big a job for any person to do as a side issue. About a year and a half ago we were fortunate in securing for this work the services of a young woman who was interested in dentistry and, altho she knew little of the dental literature, has developed rapidly along this line. At this time she can handle the work without a great deal of direction, and she is willing to make this her task for at least a number of years to come. We have, therefore, reached a point where our plans may be carried forward.

The Plan for the Index.

Two years ago I was directed by the officers of the Index Bureau to spend what money was left in the treasury in developing a definite plan for doing the indexing, so that we might present not only the plan of indexing, but the financial problems involved with it. Last May the amount of money that was left had been spent. Since that time I have financed the matter personally, but that is purely incidental and I do not want this body to take it into consideration at all, as I can get this money from another source if necessary.

I have here for distribution some copies of a proposed plan for publishing an index of dental literature. While this booklet is in the main self-explanatory, I wish to call attention to several problems which have confronted us. One of the greatest difficulties has been to determine the list of journals that should be indexed, and how much we should index in those journals. We have finally listed three British, three Canadian, two Australian journals, one New Zealand journal, and nineteen journals published in the United States. There are others which might possibly be included. They are principally the journals published by the dental schools, the various alumni associations, the fraternities, and state societies. It occurs to me that most of the material in this latter group of journals should not be indexed, but it might be worth while to review these journals and perhaps now and then include an article. In other words, the plan should not include the indexing of journals of this class, but we should add an occasional article where it seems worth while. Then there is a list of trade journals which we should not index at all.

We endeavored to draw up a definite statement as to what groups or articles would be indexed, but the scheme of publication is so different for the various

journals, and is so often changed by a single journal, that a fixed plan seems impractical. This study alone leads us to hope that the publication of the index will bring about some improvement in our Journal literature. We finally made out a separate memorandum for each journal, expecting to modify it from time to time. In the department of Abstracts in the journals published in the United States we have indexed all of the abstracts that were taken from foreign journals even tho they are from the British journals which we are indexing, because many men in this country do not take foreign journals. To this rule, as to others, we are making exceptions frequently where we find articles that we think ought to be included.

An Index Classified by Subjects.

The plan is to publish a classified index, grouping related subjects. Articles will not be published under alphabetical headings. For instance, the subject of Gold Fillings will not be indexed under G, but under the heading of Operative Dentistry. Under the number D2, will appear a list of articles published on the general subject of Operative Dentistry; under D22, all general articles on Filling Teeth, then immediately following will come articles on Gold Fillings, Amalgam, Cement, Gutta-percha and Tin; under D23 Inlays; D24, Pulp Treatment; D25, Prophylactic treatment of caries, cleaning teeth; D26, Bleaching Teeth, discolorations. This does not mean that it is necessary for one using this index to know the plan of classification, as there will be an alphabetical index to the classified index. For instance, to look up the subject of alveolar abscess, one would look in the alphabetical index and will find there the page on which the articles on that subject will be found. When one turns to that page he will find the articles on alveolar abscess, and related subjects will be found on preceding or following pages.

Under this plan we have all the articles on each subject in one group. For instance, in the sample pages submitted are the articles on Sytemic Conditions and the Teeth, which appeared in four journals for the five-year period, 1911-1915. These are so arranged that all of the articles in each journal for the full five-year period are grouped, the names of the various journals appearing in alphabetical order, with the group of articles in each immediately following.

The Personal Index.

Part II will be the personal index. In this, names of authors will be arranged in alphabetical order, with a list of books, papers, discussions, clinics, etc., for each; titles of books will be printed in small capital letters. For each discussion the classification number of the paper discussed is given, in addition to the page on which the discussion will be found. All the way thru the Index the first and last pages of every article will be given so we may know the length of the article; the number of illustrations for each article will also be entered.

In adopting this plan for the personal index we had two objects in mind: First, that it would be of distinct value to each man doing much writing, to have an index to his own work. Second, it is going to help sell the Index; it is a "Who's Who" proposition. When the index is published for a five-year period we can write each contributor telling him how many references there are to articles he has written, or papers discussed, and we hope to get his subscription for the two reasons mentioned. It gives a personal value to the Index which otherwise it would not have, and we believe it will help to sell it.

Size and Cost of the Index.

For the group of journals selected both the personal and subject index published in this form would make an Index of about 120 pages for each year.

The plan is to publish each year a paper-backed volume, keep the type standing and then at the end of five years have it all put in a five-year cloth bound volume, which would be a book of about 600 pages. This would give a paper bound volume each year for four years and then each fifth year we would get a large volume and throw these other copies away. If, instead of this, we were to have the yearly copies bound in a five-year volume, one would have to look over five indices, if he wished to find the articles published on any subject during the five year period. With the five-year volume the type will be rearranged to bring all of the articles on each subject together.

If we had before us only the problem of beginning now and publishing the index from this time forward it would be a simple matter. But personally I am not willing that we should go on with the proposition unless we shall take care of the literature of the past. Therefore our plan is that we should publish each year an index of five years or more of the literature of the past and one year in advance, and to do this we have made out the following schedule:

1918, in June, publish a 5-year volume 1911-1915, and one year volume, 1916.

1918, in December, publish a 5-year volume 1906-1910, and one year volume, 1917.

1919, publish a 5-year volume 1901-1905, and one year volume, 1918.

1920, publish a 10-year volume 1891-1900, and one year volume, 1919.

1921, publish a 15-year volume 1876-1890, 5-year volume, 1916-1920.

1922, publish a 37-year volume 1839-1875, and one year volume, 1921.

If we do this, it will take us only about five years to have a complete index of our dental literature. Previous to 1900 the number of journals becomes less and less and we can cover more than a five-year period each year. I have already indexed a line of journals (The American Journal of Dentistry, the Dental News Letter and the Dental Cosmos) from 1839 to date and considerable other indexing has been done on the older journals. There was but one journal from 1839 to 1847, and a very few from 1847 to 1875. Even if we do not live up to this schedule, which we likely will not, nevertheless it gives us a working basis.

Now as to the cost: I think we all realize that the bids we get from the printers today are much higher than they will be after the war. On the other hand, I think we should make our plans to have ample funds, and then if we have some left over a rearrangement of the cost can be made another year. The printers' bid for this work is $490 for 1000 copies of the one-year paper bound volume and about $2,300 for the five-year cloth bound volume, which would make a printers' bill upon this present basis of practically $3,000 for the six years' publication, based on 1,000 copies. We should not publish any less than that number even if all are not needed now. The expense would not be very materially reduced by the difference between 1,000 and 500 copies. Getting these volumes out would cost, in addition to the printing bill, only the salary of the lady in charge, $900, and a small amount for cards, etc., so that $4,000 would be an ample figure, and I believe that this can be reduced somewhat. As this covers the cost of an idex for six years, it is an average of but $666.66 for each year.

I am now in a position to "deliver the goods" so far as the Index is concerned, but I prefer not to carry the financial problems incident to it. If the Institute is not willing to take care of those, I have done my duty and the question is up to the Institute. However, I wish to present the following plan of financing which is the most practical thing we have been able to figure out: The expense should be guaranteed by the colleges composing this Institute, being di-

vided among the various colleges in proportion to the number of students in each. This does not mean that each college would be required to pay the amount guaranteed. When the Index is ready to be published a letter will be sent to each dentist who has contributed a certain number of articles, asking for a personal subscription, and possibly two or three hundred copies can be sold in that way, setting the price at $5 each. In proportion as we are able to sell copies to individuals will the cost to the schools be reduced, each school paying its proportionate share of the balance. Each school will, of course, be supplied with a sufficient number of copies of the index, and may further reduce its outlay by selling some of these.

We would like to have from those present here today some expression of opinion on the plan as a whole, then the matter can be worked out in detail by the Executive Board.

At the close of Dr. Black's report, the following motion was made and unanimously carried:

"The general plan presented has the approval of this body, and the Executive Board is hereby directed to work out the details and to then present the problem to each individual school in the form of a definite agreement which the various schools may sign, this to be the basis for carrying on the work to completion."

THE TEACHING OF THE TECHNIC OF CLEANING, CURETTING AND FILLING ROOT CANALS.

By Edgar D. Coolidge, D.D.S., Chicago.

THE executive committee asked me to write on the subject of the Teaching of Root Canal Technic in the Dental College.

In reviewing the proceedings of the Institute, I find no other paper on this subject, altho I find one on the Technic of the Treatment of Pulp Cavities by Dr. Leuman Waugh, read at the meeting in 1910. However, I have assumed from the subject given me that it was desired that the paper should treat of the preparation of root canals for filling and the technic of filling them, which I have attempted to do.

In considering this subject one must ever keep in mind the importance of the service rendered and its vital relation to the general health of the individual. One may not be able or willing to agree that the teaching of this subject requires so much equipment or such exacting technic as will be outlined in this paper until one is thoroly convinced that infection, absorption areas, denuded root ends or even areas of lowered resistance due to injured or irritated tissue where a state of chronic inflammation exists, are all injurious to general health and may be the source of bacterial development from which other organs and tissues of the body become infected by metastasis producing a score of diseases and pathologic conditions any one of which may seriously handicap, if not entirely incapacitate the individual. However, when we take into consideration that from fifty to eighty per cent of the root canals filled in the past are not only imperfect, but abscessed, can we

fail to recognize the need for more careful and more thoro operations in root canal treatment?

Some very startling statements have appeared in the recent literature in regard to the prevalence of chronic infections around root ends of teeth having imperfect root canal fillings. It is stated,[1] that as many as 89% of arthritis patients in one clinic showed periapical infections and chronic abscesses and 74% of patients with other systemic disorders carried the same mouth condition. Another writer states[2] that of root canal fillings which might be classed as good from the radiograph, only 8% were abscessed, while 65% of those classed as poor from the radiograph were abscessed. One very significant fact of this statement is that a very large proportion of poorly filled canals result in chronic abscess, and more large canals enter into the figures than small ones. It is more often the unfilled portion of a large canal that results in periapical infection and chronic abscess than the unfilled portion of the small canal; however, this does not remove the responsibility of leaving small canals unfilled by any means.

The possibility of filling a large or a small canal perfectly even after thoro cleaning to the foramen is uncertain, and unless it is radiographed there is no way of determining the result. This part of the dental service is of the greatest importance since it is so closely related to the general health of the patient. Can we afford to be satisfied with anything less than the best that can be taught or to accept anything less than the very best that can be done in these operations?

Let us consider for a moment some of the reasons why the results of these operations are so unsatisfactory and so often cause great discomfort, suffering and inefficiency of individuals so afflicted. Let us assume that every operator is careful and conscientious and makes a faithful attempt to do his day's work well. There are scores of temptations presenting while the work is in progress, and sooner or later many a determined beginning is warped before the operation is complete owing to some difficulty, common, not only to student operators, but to one of experience, such as the difficulty to place a rubber dam on a short or broken root; an accident tearing the rubber; breaking a broach; losing or plugging up the canal before getting it open; an impatient, restless patient desiring a quick result; loss of interest by operator due to slow progress with the case, or perhaps a feeling of inadequate recompense for the amount of time and energy consumed. We may take great precaution in demanding a complete operating equipment and thoro sterilization of every instrument and all material used, but have a failure in the end unless there is some means of overcoming the subjective difficulties encountered along the way and some means of inspiring interest and enthusiasm sufficient to carry the operator on until he attains the result he started out to reach.

There is no other operation in dentistry that requires more patience and persistence than the cleaning and filling of root canals and what reward is there for a careful and painstaking effort other than the feeling of satisfaction of work well done? Had the effort been spent on making a crown, an inlay or a filling, the result would be a visible object, a smooth, polished, shapely creation of his own, perhaps a work of art to stand as a monument to his success that he may ever think of with satisfaction and pride. But the root canal filling buried deep beyond the sight of man can never appeal to the same sense of pride and call forth such a display of patience and industry unless it be brought into his vision, its good qualities revealed and its defects left to gape and stare at him every time he thinks of that tooth or the patient for whom he may have labored almost to the limit of his endurance.

[1]Dr. F. B. Moorhead, Journal A. M. A., 1916.

[2]Dr. A. D. Black, Journal A. M. A., Aug. 25, 1917.

We must admit that sooner or later every patient will be subjected to X-ray examination for some purpose and then the test will come, so why not make this X-ray examination the requirement of every root canal filling before continuing further work upon the tooth or allowing credit for the root canal filling?

In reply to letters sent to each college of the Institute, I received thirty answers stating as follows: nine require radiograph record of every canal filling; eleven require radiographs from a small per cent to fifty per cent of their canal fillings, while the other ten make no requirement at all. Three replies included a statement that it was to be a requirement in the near future.

The possibility of failing to completely fill a canal even tho thoroly open to the foramen, is quite usual even to an experienced operator. Very frequently two or more attempts must be made before a perfect result is obtained. Where the radiograph is not made there would be no evidence to show the need of a second attempt; hence, many accessible canals would be left imperfectly filled and there would be little progress in this work.

The Equipment.

It is most essential that the student is given the proper equipment with which to operate in root canals. It cannot be safely left to dental supply dealers to select the equipment altho the dealers are glad to co-operate and many times may suggest to the department to advantage. Where there is a published list of required instruments and the student purchases all, he enters upon his work well equipped, but it is difficult to impress upon many students the need of replenishing the stock at all times before it becomes exhausted.

In some schools it is a general practice to furnish a new broach with each operation so that the student may not want for proper equipment. However, my experience has enforced upon me demands for such a varied number of different broaches that it seems impractical to furnish the broaches to the student.

We suggest the following list of broaches and other equipment for this work:

Equipment for Root Canal Technic.

Broaches.

Barbed.

XXX Fine regular
XX Fine regular
X Fine regular
Fine regular x
Apexographer

Smooth.

XXX Fine regular
XX Fine regular x
X Fine regular x
Fine regular x

Mounted on Aluminum Handles.

XXX Fine barbed short handles
XX Fine barbed short handles x
X Fine barbed short handles x

Kerr Pulp Canal Files. x

XX Fine short spiral
X Fine short spiral
Fine short spiral
Medium short spiral

Friedman Germania Broaches. x

XX Fine short spiral
X Fine short spiral
Fine short spiral

x 1. Metal broach holders
2. Gates—Glidden drills, small, medium and large
x 3. Root canal pluggers Nos. 34, 36, 38 and Kerr No. 1
4. Platinum wire loop—20 ga. mounted in glass rod
x 5. Medium flat file and filing block
6. Sterilized cotton—Johnson & Johnson
7. Cotton pellets—sterilized
x 8. Aseptic napkins
x 9. Absorbant canal points—Johnson & Johnson
10. Gutta-percha canal points
11. Covered chlora-percha bottle

xRequired equipment.

12. Bottles with ground glass dropping stoppers
13. Screw top bottles for surplus sterilized broaches
14. Minum trays
x15. S. S. White medicament tray

Sterilization.

The problem of sterilization in the Infirmary clinic is one of great proportions, and when we undertake to carry on a practical and thoro method which will include root canal equipment, we have added much difficulty to this problem. I have stated before in this paper that to have the equipment sterile to begin with, does not insure it against contamination and I believe the difficulty of *maintaining asepsis* thruout an operation of this kind is even greater than that of initial sterilization. All broaches, broach holders, pluggers and other metal instruments may be boiled in the usual Infirmary sterilizer. There is some difficulty encountered here, as there are so many small instruments liable to become lost. However, the broaches may be wrapped in a small piece of muslin or cheese cloth and kept in a small package while in the sterilizer and immediately spread out to dry when removed. Another method may be used, such as keeping the broaches while not in use, in a 10% solution of lysol. Either method will be abused by shirkers and careless operators and constant supervision is demanded to maintain regularity and to assist the student in cultivating good habits.

There seems to be at present no satisfactory method of sterilizing cotton, dressings and gutta-percha canal points for Infirmary use. Some schools are using the Penz sterilizer, others the autoclave and a few are attempting to sterilize with formaldehyd, but the great majority are making no effort to sterilize these materials, and I doubt if any of these methods mentioned above are desirable enough to become universally used. The reply received from the Northwestern College of Dentistry offers a very possible solution for this problem in the plan under way for their use. The plan consists in dry heat ovens heated by electricity and controlled by thermostat in which all materials for root canal operations may be kept sterile and given out to the students for each operation. Gutta-percha points can be sterlized with dry heat, allowed to cool and then cut for use as needed, or they may be kept immersed in alcohol; however, the former method is more efficient. There is necessarily quite a little work connected with the proper sterilization of these materials and it requires a competent nurse to take charge of it whose time will be very well occupied with these duties and associated duties of distribution of the materials.

There is a certain routine of sterilization which must become a habit with the student or operator before it really becomes a part of the regular operation. I have watched the boys in the Infirmary and have found it to be as customary for some to be particular about these details as it is for others to be careless, and it is no different from other habits these boys form. If a method of regular sterilization can be adopted that is simple, but *efficient* and *practical* and the habit is well formed while they are in training, the probability of careful work after graduation is much greater.

In connection with the sterilization of broaches I wish to mention here as well as later in my paper that the equipment is not complete without a suitable tray for medicines to be placed upon the operating table. The S. S. White Mfg. Company have a medicament tray which is most useful for this work. It has suitable grooves and concavities for several drugs in one of which alcohol may be kept and another phenol solution and each time before the broach is inserted in the canal it should be immersed first in the phenol and then in alcohol and touched upon a dry, sterile bit of gauze

xRequired equipment.

to absorb the moisture before using. If this routine is faithfully carried out at each operation, I believe the danger of infection from broaches would be overcome to a very large extent even tho there were a failure with the boiling or a contamination during the operation.

The cotton for use in these operations should be sterile. One way this can be accomplished is by having the student apply for sterile cotton for each operation. Very little cotton need be used in root canal work, as it is neither necessary nor advisable in my estimation to use anything but absorbent paper points in the canals. Wrapping cotton upon a broach is a treacherous procedure and one that can be easily omitted, thus avoiding the danger of infection from this source. There is a need for a suitable dry oven sterilizer for Infirmary use with a practical method of distribution of the cotton, absorbent points and guttapercha points. The care and details involved would be quite burdensome but it seems to me the importance of the result would justify the trouble.

Opening and Cleaning the Canal.

Since it is impossible to include within the scope of one article on this subject every phase of the work involved in root canal operations, it is necessary to omit some important features and slight others in order to give proper emphasis to the selected ones. I shall not attempt to take up the matter of pulp devitalization or anesthetization, nor the treatment of various pulp conditions found but will confine the paper to the subject given me on the technic involved in root canal operations.

The first requisite in teaching this part of the work is that of having efficient assistants, thoroly trained to carry out the teaching in the clinic. There should be co-operation and complete understanding between all in the department which can only be possible where there are frequent conferences of the staff. The teaching of the lecture room alone would be very inadequate because of the lack of experience and inability of the student to grasp so many details and retain them. The strength of the teaching is developed when the student is operating and his mistakes can be detected and pointed out, and misconceptions of the teaching may be corrected. In the lecture room the desired technic can be given by explanation and illustration, but instruction in the clinic while the work is being done impresses the student mind so deeply that he never forgets. I do not give all the class room work on this subject at one time, but at the beginning of the year outline the technical procedure, and later in the year take up the detailed study of pulp removal and canal filling, and review the technic again. This allows the student to profit by some practical experience and gives him a better understanding and appreciation of the instruction on this very important subject.

I will now proceed to give a description of the technic used in the University of Illinois, School of Dentistry.

Asepsis. Repardless of the condition present within the pulp chamber and canals, the same aseptic precautions should be taken. The mouth should be sprayed and the gum and adjacent teeth painted with tincture of iodin. The rubber dam should always be placed to isolate the tooth, and the teeth included thoroly washed with alcohol and painted with iodin again. The equipment all sterilized and all supplies ready upon the tray, the tooth may be opened and should be treated with the same degree of care that a surgeon would treat a wound upon some other surface of the body. If we wish to prevent the awful condition found by radiograph at present, from being found in the future as a result of our present methods, we must eliminate the uncertainty and carelessness from these operations. The instruments and materials must not be handled and they should always be sterile. If the precaution of dipping the broaches in phenol and then in alcohol, is faith-

fully adhered to during the entire operation and the sterile materials are not contaminated by handling or by coming in contact with any septic matter, there is a splendid opportunity for an aseptic operation.

Access to Canals. This is a very important step in the successful outcome of the operation. I know of no better means of impressing upon the mind of the student the purpose of gaining access to the canals and the extent of necessary cutting, than by lantern slide, chart or drawing to illustrate. The fact that this has not been sufficiently impressed in the past is made very evident in the radiographs where we see pathetic results in patients' mouths from imperfect root canal work due to attempts to operate around obstructing walls that should have been cut away before an attempt was made to clean the canals. Cutting away obstructing walls and angles at the beginning saves much time and removes a difficulty which might make a failure of the entire work upon the tooth if allowed to remain. The canals should be in plain sight before the broach is put into them. To enable entering the canal easily the Gates-Glidden drill can be used to make a funnel shaped entrance, but it must be used with extreme care. It is very desirable to have a radiograph of the tooth to aid in gaining access without injury to the root and also to observe the number of the roots and the position in which they lie.

Filing and Curetting. The process of enlarging the canal is one that requires great patience and much time. The first step is to pass the smallest smooth broach to the apex of the root and make a mark or bend in the broach to indicate the length. This serves as a guide in the work following as to the length and direction of the canal. This broach is laid aside where it can be referred to constantly while working. Should the canal be a large one it is often possible to clean it completely with barbed broaches and prepare it for the filling, but where the canals are small and curve as they frequently do in the mesial root of lower molars and buccal roots of upper molars, first upper bicuspids and occasionally cuspids and lower incisors, it is necessary to work with great care to avoid accidents, such as losing the canal or plugging it up with debris or leaving part of a broach which is most unfortunate. Wherever the finest smooth broach will pass it is possible to enlarge and fill the canal unless an accident occurs which should be avoided. Where the canal is extremely small and curved, the entire operation must be carried on by the up and down motion with no turning or twisting of the broach around and around. Smooth broaches may be rolled between a medium coarse file and a block of wood to make a rat-tailed file of them in the graded sizes and with the aid of 30% sulphuric acid, the extremely small and curved canal may be enlarged and straightened enough to allow the smallest Kerr file to pass which will cut quite rapidly. It is preferable not to use the acid with anything but smooth broaches, as it weakens them and accidents may more easily occur. The acid should be neutralized with a saturated solution of sodium bicarbonate. This process of neutralization causes effervescence and brings much debris from the canal. Every time the instrument is inserted in the canal, it should be passed to the apex of the root and the canal enlarged thruout its entire length constantly to avoid losing the canal. The process of enlargement and curettement should be carried on progressively and consecutively with each size broach one by one until the larger sizes will pass to the apex. Should the operator become impatient and skip a size or two at a time, the result will usually be a failure, as the larger sizes will not pass to the apex and soon a ledge is made where the canal curves and the canal is lost and rarely ever can be found again. The barbed broaches and files should be used alternately, for curetting and rak-

ing out the fillings and debris. This process should be continued until the canal plugger No. 34 or Kerr No. 1 will pass to within two millimeters of the apex.

Measure Wires and Radiograph. When the canal has been enlarged and is about ready for the filling it is advisable to place wires in the canal cut so as to reach from the apex of the root estimated as near as possible, and flush with the surface of the cavity and a radiograph taken to check up the work to this point. It is quite important to have the measure wire flush with the surface of the cavity to avoid the difficulty found where the radiograph causes a distortion of the size of the tooth, as it is much easier to deduct the amount of distortion where at least one end is flush.

The process of enlargement and currettement is usually too long for one sitting and it necessitates sealing the cavity and continuing at other subsequent sittings. The sealing of drugs in the tooth for disinfection of the dentin is not as important as the mechanical filing and curetting that should be done before filling the canal. Only such drugs should be sealed in the canals as will cause no injury to the soft tissue. Sealing should be thoro to prevent ingress of moisture and this can best be done with both cement and gutta-percha together, one over the other.

Filling the Canal.

In filling root canals the uncertainty of the operation has always been a great handicap to the operator. Many conscientious operators have felt assured of a good filling in the past when they sealed up the tooth after having had a good response from the patient while filling the canal and the result of this uncertainty is the cause of the unfortunate condition we find so often around these root ends today. If we can eliminate as much as possible of the uncertainty and depend upon measurement and quantity of material, there will be better results.

When the canal is ready for filling, the plugger No. 34 or Kerr No. 1 will pass to within three millimeters of the apex of the root. This is determined by the length of the measurement wire and radiograph which should be before the operator. The plugger should be marked so as to serve as a guide to indicate when it is in the canal the proper distance.

Dehydrating. The canal should be dehydrated with alcohol followed by warm air and absorbent points. It is much safer to depend on these points than upon sterilized dressings wrapped on smooth broaches since there is always danger of contaminating these dressings when using them as they so often come off or loosen and one is tempted to take them in the fingers. Another advantage in using the absorbent point is that the end may be clipped off to measure the diameter of the foramen to use as a guide in selecting the proper sized gutta-percha cone for plugging the foramen.

Filling. Having selected a cut piece of gutta-percha cone of such a size that it will not pass thru the foramen and slightly longer than the two millimeters of space between the end of the plugger and the foramen, it should be attached to the end of the plugger by slightly heating the plugger and touching it to the cone. The canal should be slightly moistened with eucalyptol followed by one drop of thin chlora-percha carried well to the apex. The plugger carrying the cone is carefully inserted and pressed into the canal until the mark is flush with the surface of the cavity, the landmark which was selected. Now we have a two millimeter space with a fairly accurate estimate of the diameter to be filled with a carefully selected piece of gutta-percha and a small amount of chlora-percha for lubrication and surplus. The only space that need concern the operator seriously is reduced to a minimum and a fairly close estimate of its capacity can

Figure 1.

Extracted tooth with canals enlarged for filling. Measurement wires in place flush with occlusal surface of cavity as landmark.

Figure 2.

Extracted tooth with root canal plugger No. 34 inserted should always be within two millimeters of foramen. Plugger bent at occlusal landmark for guide.

Figure 3.

Extracted tooth with plugger carrying 2 m. m. cut gutta-percha cone to plug foramen. Canal previously moistened with eucalyptol and single drop of chlora-percha. When bend in plugger reaches landmark, foramen will be sealed with gutta-percha.

Figure 4.

Extracted tooth with plugger carrying cut gutta-percha cone pressed even with landmark and foramen sealed. By accurate measurements the same result can be obtained in the mouth.

Figure 5.

Extracted tooth with root canals filled. Foramina of mesial root are on the side of the root.

Figure 6.

Student K. First attempt to fill. No measurement taken. Filling had to be removed

Figure 7.

Student K. Same tooth, filling removed and wire inserted for measurement.

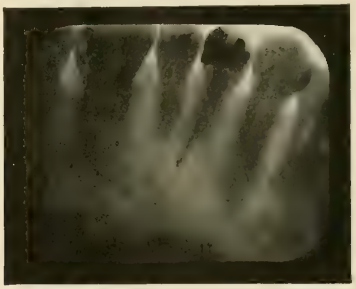
Figure 8.

Student K. Same tooth, second attempt to fill. Root well filled. Little excess.

Figure 9.

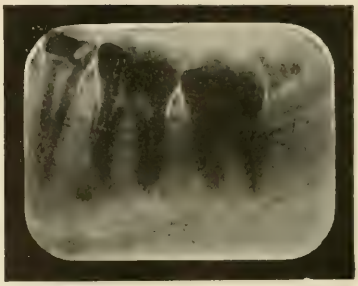
Student O. Canal well filled by measurement.

Figure 10.



Student O. Canal well filled by measurement.

Figure 11.



Student O. Canal fairly well filled but not packed sufficiently.

Figure 12.

Student W. Canals filled but not packed sufficiently. Canals should have been enlarged to accomodate plugger to at least 3 m. m. from foramina.

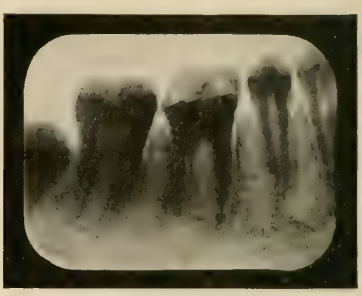
Figure 13.

Student G. Canals well filled by measurement. Very little excess altho large foramina.

Figure 14.

Student G. Canals well filled by measurement. Very little excess altho large foramina.

Figure 15.



Student G. Canals well filled by measurement

Figure 16.

Student Q. Canal only partly filled. Student failed to enlarge sufficiently. Filling to be removed.

Figure 17.

Student Q. Same tooth. Filling removed, canal enlarged. Gutta-percha packed to foramen.

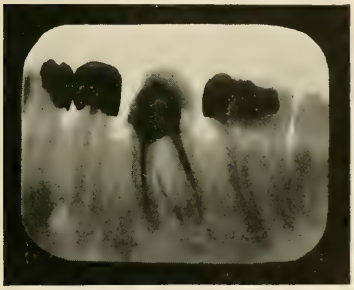
Failure 18.

Student T. Result of twisting broach or reaming canal with force. Failure.

Figure 20.

Student C. Bicuspid canals well filled by measurement.

Figure 19.



Student C. Molar canals well filled by measurement.

Figure 21.

Student C. Second molar canals well filled by measurement.

be made. Should the cone at the end of the plugger not be lost on the way into the canal when the mark is flush on the surface, the space will be filled full. If there should be too much liquid only a small portion will be forced thru the foramen and probably such a small portion that it will do no harm. The cone should be carefully packed and then other short pieces of cut cones, two to three millimeters in length, should be packed one by one into the canal until it is full. This gives a uniformly dense mass of gutta-percha which I believe is as impervious to moisture and bacteria as anything that can be used for filling canals at the present time. The success of the entire operation is to a very large extent dependent upon the first piece of gutta-percha cone that is packed to fill the apex of the root. Should that fail to reach and thoroly fill the space there, the remaining part of the filling would be of questionable value.

Radiograph. Every root canal filling should be radiographed to serve as a record as well as to inspect the work. Regardless of the experience an operator may have had there is no certainty about a root filling and many times two or more attempts will have to be made to get a perfect result. The radiograph is the only evidence we have in this work and it should always be used by the one who fills the canal to prove up the work. Every canal cannot be cleaned and filled

to the foramen, but unless every canal is filled as far as it is possible to clean it, the work is incomplete and should be done over, and the only way to discover this is by the use of the radiograph with measurement wires in place before filling and after the filling of the canal. The canal filling should not be passed upon by any other method of examination, neither should credit be given until inspected by radiograph. The basis upon which credit may be given to encourage the student should be in proportion to the time required to complete the operation. I would prefer to give the required number of credits for ten perfect results than for twenty indifferent ones, and I believe the student is far better prepared to care for the public who puts forth his greatest effort to obtain a perfect result and learns the price he must pay for success.

Outline for Root Canal Technic.

1. Radiograph to show number, shape and direction of roots.
2. Asepsis.
    1. Wash or spray mouth.
    2. Paint gums and neck of tooth with tincture of iodin.
    3. Isolate.
    4. Wash teeth included with alcohol.
    5. Paint with tincture of iodin.
3. Gaining access to canals.
    1. Uncover entire pulp chamber.
    2. Cut away buccal, lingual and mesial walls to bring all canals into view.
    3. Cut away walls to eliminate all curves possible.
4. Cleaning and enlarging canals.
    1. XXX fine smooth broach (Pathfinder) to ascertain length.
    2. Large canals, barbed broaches to clean.
    3. To remove old gutta-percha filling—Xylol, explorers, spiral short broach.
    4. Small canals.
        1. XXX fine smooth broach file.
        2. XX fine smooth broach file.
        3. X fine smooth broach file.
        4. XX fine Kerr file.
        5. X fine Kerr file.
        6. XXX fine barbed broach to remove debris.
        7. XX fine barbed broach to curette and enlarge.
        8. X fine barbed broach to curette and enlarge.
        9. Fine barbed broach to curette and enlarge.
        10. Fine Kerr file.
        11. Apexographer or X fine barbed broach to remove debris.
        12. Sulphuric Acid 30% as indicated.
            1. Neutralize with Sodium Bicarbonate.
        13. Enlarge until No. 34 plugger passes to within 2 mm of apex.
5. Measurement wires and radiograph.
6. Dehydrating.
    1. Alcohol.
    2. Hot air.
    3. Absorbent canal points.
7. Filling canals.
    1. Mark length of canal on plugger.
    2. Measure size of foramen with absorbent canal point.
    3. Eucalyptol to moisten canal.
    4. Chlora-percha — very small amount.
    5. Cut cones, 1 to 3mm long, selected size.
    6. Attach proper cut cone to No. 34 plugger and plug 2mm space at apex.
    7. Continue until full—condense each piece thoroly.
8. Radiograph.

Discussion.

Dr. D. M. Cattell, Memphis:

Not having seen a copy of the paper till just now I am not ready to discuss it, but I must say a word about my

friend Coolidge: *He has done it*—he has given food for thought. From the days when Callahan appeared before us until the present time Dr. Coolidge has interested me in a way a little beyond the usual man in the study of this subject. And, by the way, while I think of it, can any of you tell me when Dr. Callahan first published that he introduced something into the root-canal that would soften the walls so that he could scrape them there by enlarging the canal? You Chicago fellows, Odontographic men, remember that fifteenth anniversary of the Odontographic Society, the greatest gathering of dentists up to that time that had ever come together in the United States, even larger than the World's Columbian Dental Congress in '93. At that meeting back in the nineties Dr. Callahan of Cincinnati introduced the aqueous solution of sulphuric acid, fifty per cent, to soften the walls.

I marked seven of the paragraphs of Dr. Coolidge's paper as he was reading, and then checked off paragraph after paragraph and now I have them about all checked. I would like to comment on every paragraph, I would like to read it to you over again it was so good, for it says just what I would like to say. But a few points only will I touch upon.

"The possibility of filling a large or small canal perfectly even after thoro cleansing to the foramen, is uncertain." His words speak what we know to be true. The long years of practice, the difficulties we have had, and the surety with which we have felt we did our work well, have been so torn up and we have been so knocked over that we scarcely know where we stand now. Since the X-ray came to our help, we have been confronted with the fact that our earlier work was seldom perfect. We have found that there is no other operation in dentistry that requires more patience and persistence than the cleansing, enlarging, sterilizing and filling of root canals. Any operation that we have that we can see what we are doing is more agreeable, it is so much more to our interest and liking. And this thing of working hour after hour, sitting after sitting, before completion—we get tired of it, even the most conscientious of us get tired. And what, then, can we expect of the student? He is tired in a few minutes. We see them at the chair placing the rubber-dam and then sticking a little cotton around and going to work, and by the time you can get over to see if the canal is opened properly they tell you that the canal is filled and that they have commenced on the gold or amalgam filling or whatever it is, and it is nearly completed.

The Doctor has opened up a field for thought to those teaching operative dentistry that makes one rather ashamed of the amount and kind of work that has been insisted upon for the student to do. I feel as tho so much of my work in teaching has not been right, not thoro enough, and I believe that many of you can say the same.

I could only repeat what the essayist has said if I were to continue, however I want to emphasize this point: The use of the X-ray. I know that most of the schools have an X-ray machine; we have a beautiful one down there in Tennessee, one of the most expensive, but while we have not had the experience with it that some other institutions have had, we have great hopes for the future. The essayist showed us plainly what we have to contend with so far as the student is concerned and also what the student has to contend with, and he has shown us how difficult it is to get to the end of the canal. He has shown us many difficulties, but he has indicated the means whereby we may overcome them. I think this paper is the best of its kind covering the subject that has ever come before this body. I will admit the first half of it sounded as tho it should have been read before some state organization, but the last half appeals to teachers in their work with students, and I beseech for it a re-reading when it

comes out in print. There is more in it than appears on the surface, and the more we will read it paragraph by paragraph and see the difficulties in the way and the remedies that have been pointed out, the better teachers we will be when we get thru reading it the fifth, sixth or seventh time.

Dr. H. M. Semans, Columbus:

Dr. Coolidge has given us a very timely paper, in that we are confronted by a condition in dentistry which is probably the most serious now under consideration by the profession at large. This condition of affairs is one that has placed squarely before us the fact that, in an appalling high average of cases in general practice, non-vital teeth are constantly being placed in a condition which endangers life to a constant mortality. If this mortality cannot be lowered, then non-vital teeth must depart from our attention and care as a useful member of the dental function. The showing of bad results, as presented to us the past few years by our pathologists and others, almost makes us ready to throw up our hands and give the pulpless tooth the go-by. Almost but not quite.

Dr. Coolidge has just presented to us technical methods perhaps not new to any of us, but the way of going to the work has a new aspect; and this should receive our careful attention. Rules and regulations can be made to govern all procedures, but the method of execution can completely upset the results.

I would like to emphasize a few of the ways of carrying out these technical rules and regulations as given in this paper. All the way thru the paper there is constantly placed before us the fact that thoroness can only be had by a complete separation from everything else during the care and treatment of the canals. As the essayist says, the student in a large majority of cases will assume certain careless habits in his technical training unless constantly guarded. Our attention is called to the fact that an assistant or nurse, giving entire time and attention to the care and placing in the student operator's hands all materials, will go a far way in observing asepsis; yes, it will do more, in that the student has impressed on his mind a rigid rule not to be departed from, which is that asepsis can only be had by strict attention to what he is doing. Individually, perhaps, students can carry out asepsis by attending to the obtaining of materials themselves, but the chances for slips in procedures are rendered greater. I agree with the essayist that the radiograph should be constant in attendance, with the student work, both in showing what he does or does not do, as well as again impressing with the thought of a constant desire for thoroness. Dr. Coolidge impresses us with the idea of constant care and thoroness to the extent that more and more time must be given over to the canal during its care and restoration. To this I am agreeable also. The day has gone by when we might argue that the pocketbook of the patient governs our time spent on what we may be doing for said patient. We are professional men, and servers and savers of human life today, and in the future, only in proportion to the painstaking care we give to our work. We are right now confronted with the fact that time, care, and attention must be driven home to both the operator and the patient, in all canal procedures. If we, as operators, should show any impatience to our patients, it is when they refuse to recognize that the financial obligation is a large matter, rather than a small matter. As Grover Cleveland once aptly said, "We are facing a condition, gentlemen, not a theory." This condition is the tremendous importance of canal procedures. I have my doubts whether we should allow this work to be done out in the operating clinic room. The seriousness and the sacredness of the work would undoubtedly be increased in our students' minds should we require a separate operating room for such work, with separate service and instruction and

guidance. Our fundamental technical training also can go a long way in teaching the importance and care, and care and then more careful attention.

Dr. Coolidge dwells principally on the work done for the canal in the patient's mouth. The technic-room work no doubt can go a long way in getting effective results in the clinic.

The essayist has placed before us an interesting array of instrument equipment. The personal equation enters into such equipment, its variation, number of articles required, and method of dispensing. For my part I like the dispensing of broaches by the college for each individual case, but constant care must be observed to avoid such dispensing, and it probably, if done thoroly, would require separate and individual attention as to assistant nurse and instructor attention.

Taken in all of its phases, the paper is so comprehensive and so thoro that I could well remain silent in discussion, and let it rest on its merits.

Dr. Frcd W. Gethro, Chicago:

You have listened to a well written comprehensive paper on the teaching of root canal treatment and root filling compiled by one of our best teachers. The methods suggested are sound and will stand the light of closest examination. They are the combined result of a well trained, hard working student of this particular subject plus the experience of a most careful and conscientious operator.

The outline presented is so nearly parallel to the course given at Northwestern University Dental School that I could quite appropriately make a very brief discussion by saying—well done. There are, however, a few points that might be elaborated on and some that admit of discussion. The introductory remarks of this paper suggest the necessity of the teacher realizing the importance of the service rendered and its vital relation to the health of the individual, etc. If a teacher is to present this subject and get the greatest amount of benefit from the study of the subject, he must first be fully alive to the great importance of the subject; second he must be able to stimulate, encourage and inspire the assistants and demonstrators as well as the students of the classes. He must be able to present the subject matter with that strong enthusiasm born of actual experience. If it is true that a large percentage of our failures are with the larger and more accessible canals what is the reason? Many believe that it is because the average operator is carrying infection to those canals and perhaps carrying infection thru the foramen due to the accessibility of these larger canals. If this is true it is a sad commentary on the knowledge and skill of the average operator.

In my opinion there is no department of dentistry in which the profession is so deficient as the one we are considering. If this is true we must realize that great effort must be put forth to correct this evil. If we are to strike at the root of this condition we must begin with the dental school. There must be more effective teaching, there must be unbounded enthusiasm which should permeate the whole faculty and to get the best results there should be uniformity in teaching and practices of the various members of the faculty. There are too many differences of opinion at the present time in reference to root treatments and fillings and there is nothing concrete to present to the students. Faculties ought to get together thrashing out their individual ideas and evolve a method that all can recommend from a teaching standpoint. This is team work and the only effective way of teaching.

A teacher of root treatment and filling is not doing his full duty to his students unless he deals with all phases of the subject. He must prepare his students to a full realization of the difficulties usually encountered and he must analyze the various reasons for these many failures. The average fees received for this class

of operating is out of all proportion to their value and importance. No discussion of the subject is complete without reference to this unfortunate condition. A surgeon can frequently perform one or more major surgical operations in the same time taken for the treatment of root canals of a single tooth. There can be no doubt but what this particular point of poor fees is largely responsible for the poor results obtained in the treatment of teeth. The entire blame for this condition must be placed on the dental profession. If the profession realized the importance of this class of operating and educated the public, educated their patients, that part of the problem is solved. Any opinion held by the public on questions of this nature is but a reflection of the teachings of the dental profession.

I differ with the essayist on a few minor points and will refer to them very briefly. Instead of using iodin on the teeth and surrounding tissues prior to the adjustment of the rubber dam, I recommend the thoro cleaning of the necks of the teeth by instrumentation followed by clean warm water in a good syringe capable of forcing a strong stream of water thru the interproximal spaces. The use of the various mouth sprays—iodin, etc., is unnecessary.

I am absolutely opposed to the use of the Gates-Glidden drills, not only for students but also for the average operator. It is a very dangerous instrument. I believe that practically all root curettement should be done with the barbed broaches. It should be remembered that there is the greatest difference in barbed broaches. Most barbed broaches are not sufficiently tempered to be effective cutting instruments for the curettement process. A barbed broach that is pliable and will bend and twist without breaking is practically useless for this procedure of curettement.

This subject is so broad and includes so many details that in order to include the points that I want to make I am compelled to summarize as follows:

1. Strict surgical cleanliness. Rubber dam always necessary.
2. Thoro curettement.
3. No strong medicine within the canals at any time. No strong acids—no arsenic. This means never use any drug that could possibly injure the delicate tissue at the end of the root.
4. Every treatment hermetically sealed with base plate gutta-percha. No temporary stopping—no sandarac varnish and cotton or similar fillings. Treatment is never started until filling hermetically seals cavity.
5. Good radiographs establishing correct lengths of roots.
6. No instrument of any kind or anything else should ever penetrate the foramen.
7. The natural constriction at foramen should ever be enlarged. It is a most important guide in the removal of pulp and the filling of the canal.
8. Alcohol and dehydration unnecessary.
9. Eucalyptol should be used sparingly in the canals for the following reasons. It is a solvent for gutta-percha, a lubricant, it removes moisture and is an antiseptic.
10. The less chloro-percha one uses the better will be the filling.
11. Roots should be filled as soon as clean and sterile.
12. Two or three treatments at most and these usually completed within two or three days.

The chief lesson to be learned is that the removal of pulps and the subsequent treatments and root fillings are always uncertain. Therefore pulp conservation is the most important thing in preventive dentistry. The only safe root filling is a normal healthy pulp.

Dr. A. E. Webster, Toronto:

I want to say just a few words in connection with this subject. I regret that Dr. Coolidge's paper did not come up in connection with my paper so that they could have been discussed together.

The essayist makes the remark that

there is no possible means of sterilizing effectively in the infirmary. But it is all very simple if we require each student to have his own sterilizer and conduct the sterilization as he would do it in his own office. There is no difficulty in having the student make his own equipment dressings if you please, or have the nurse prepare the paper points and the cotton and all and put them up in little packages, pinning them together and putting them in the sterilizer, when they are sterile at all times for use. In addition to that, he should operate from his sterilizer and not from any place around, taking what is necessary out of the sterilizer just at the time he is ready to make the operation, having the nurse present when the cotton rolls are opened up for the first time and exposed. It is all very simple, it is quite feasible.

In connection with the technic, we have heard the discussion of this subject from the infirmary standpoint. Gentlemen, if that is all the technic and X-raying that is needed by our students, then we are precisely in the same place that we were before Dr. Black originally introduced dental technic in dental colleges. Why should patients suffering have root-canals treated by a novice? Unless he has done the same operations and with the same aseptic precautions some place else before he came there patients must get poor service. For instance, why should not that student have made X-rays of teeth in the laboratory, as was shown by Dr. Gethro? Such exercises should be done under the same aseptic precautions as in the mouth. Can you expect a student, the first time he treats a patient, to be clean all at once after slopping around the laboratories for a year? It is impossible! To be clean is one of the most difficult things the whole human race has to accomplish. When you think of the efforts we make to be clean, and then expect a student who doesn't know anything about it, just as soon as a patient is presented to him to be able to follow the full ritual. He cannot do it. I have seen in our courses in the laboratory between 1500 and 2000 X-ray photographs of fillings made in the last year by our students. They are just like the ones we saw in the pictures shown here. First the student X-rays six teeth, next he opens them up and clears out the root-canals, puts the wires in and X-rays again, third, fills the root-canal and X-rays again, then files the roots down and looks at them. Now, the X-ray picture and the filled specimen do not always coincide by any means, and when we say to the profession: Here is the X-ray, the root-canal is not filled to the end. This man is guilty—it is all bosh. The X-ray does not show whether it is filled or not. It is so easy to be mistaken. We ought to be honest with our students.

Dr. Daniel H. Squire, Buffalo:

It is seldom that one has the privilege of listening to a paper which more clearly defines the method of teaching a subject, accompanied by a faultless technic, than the one which has been presented by Doctor Coolidge. It contains a very earnest plea; first, for a realization on the part of the student and I may add, on the part of the teacher also, that this work is of a different character than other operative precedures which are performed in the infirmary clinic; second for the creation in the mind of the student the value of accurate technic; third, the desire to gain a result which will maintain bodily health.

The first item may be answered by placing pulp canal work in a room set apart from the general infirmary clinic, thoroly equipped with X-ray apparatus and methods of sterilization. The psychological effect upon the students in going into another room under a surgical environment is of great value and quite sufficient in making him understand that this work is different in character from that of making a crown or the filling of a cavity in a tooth. He comes to this room for a special purpose, another branch of dental education is opening before him with its particular method

of technic and treatment. In this room are taught the surgical principles of cleanliness in a way previously unknown to him in the infirmary, because pulp canals are in close proximity to the deep structures of the face and necessitate aseptic treatment.

We are beginning a new era in the consideration of the dental pulp and its treatment. Its importance both in health and disease have grown with our knowledge of its relation to the vital processes of the body. It has never been given much prominence in the didactic teaching. In the college which I have the honor to serve we have begun with the didactic and the technical courses in operative dentistry with the teaching of the dental pulp. We desire the student to realize at the outset that the pulp is a living thing, that it occupies a certain position within the tooth; that it is always present and can be reached with a bur. The student should understand that the pulp is the most important organ of the tooth and around it all of our technical operations are performed for its preservation. It is also impressed upon his mind at this time, that when the pulp is dead it becomes equally important as a focus of bodily infection.

The drawing of the pulp in situ, then reproducing it in plaster relief, bringing out with oil paints its structure, will do much toward creating an interest in tooth dissection and pulp canal technic. It has been my experience, if other technic is presented first, that the pulp is considered secondary and will always remain in this relationship.

In consideration of the second point, that of creating a desire for accurate technic, I feel that there is too much attention paid by the student and also by many demonstrators to the number of points to be gained, rather than the quality of the work. In the treatment of pulp canals a case is either a success or a failure, therefore, I see no reason why partial credit in points should be given. I would rather that a student should fill half a dozen pulp canals, under proper instruction, carrying out every detail of asepsis, curettement and filling than to have a hundred points to his credit. Let the X-ray mark his progress and give him credit.

The desire of accurate technic on the part of the student will come thru the close supervision of the teacher in training him, not only in technical procedures, but in the liberal use of the X-ray, the sterilizer and in the keeping of a record of the results of each treatment. The student can only be taught the value of these things thru actual contact with the teacher. I do not mean that the student should watch these procedures, but that he should understand the mechanism of the X-ray machine, take the radiographs before and after treatment, attend to the sterilization of his instrument and keep an accurate record of the procedure. One of the great faults in dental training is that there is insufficient teaching at the chair and too few demonstrators are employed to do the work properly.

Coming to the third point raised in the paper; that a student must desire to gain a result in his treatment which will maintain bodily health, I wish to emphasize the fact, that if he has had the benefit of the personal touch of the teacher in all of this scientific training, he cannot help but show an interest and a desire for success. On the other hand, if he is still indifferent, he does not possess those qualities of character and mind which a student of dentistry must have, and should be advised to discontinue his studies. The time has long past when dental colleges should train men for the price of their tuition alone.

The technic requirement, which Dr. Coolidge has outlined, is quite unusual, but it comes nearer to that used in a modern dental office and I feel that we should teach our students the value of such an equipment. At Buffalo, we still furnish broaches to our students.

It insures a new broach for each operation and when a student furnished his own he never gave them up until they were left in pulp canals, and we have a demonstrator to fifteen students in the pulp canal clinic. I am much in favor of the use of files for enlarging pulp canals. The up and down motion of the file is less hazardous in the hands of a student, than the use of the barbed broach, as it seems almost impossible to teach a student that a barbed broach should not be twisted round and round in the canal. I do hesitate to allow the use of the Gates-Glidden drill in the clinic, unless a demonstrator is watching the student and is perfectly sure that the student has his eye on the drill.

I agree with the essayist in the use of paper points, as they may be passed along the canals with less danger of foreing dead material thru the apex of the root, than it would be possible to do with cotton wound upon a broach. Paper points also absorb moisture much more quickly and thoroly and give one a better idea of the size and length of the canals.

Gaining access to the pulp canals is most important in this work and a good rule to follow is that the walls of the opening should be made parallel with those of the pulp chamber.

There can be no exception taken to the technic of curetting and filling pulp canals as laid down by Dr. Coolidge. On the other hand it can be commended in every detail. It is a technic which has been advocated by leaders in our profession and why not give the benefit of this experience to the student.

I do feel, however, that some discrimination should be shown in regard to the probable success of this work as cases are presented for treatment in the clinic. We do not wish our students after they begin dental practice to advise pulp canal treatment irrespective of surrounding conditions.

Team work in the clinic has been mentioned in the paper and I believe that this is the foundation of the success of all clinical teaching. The relationship of the professor and the demonstrator must be in accord with a definite line of teaching. The heads of departments must soon realize that teaching at the chair is absolutely imperative and it is my opinion that the time will soon come, if it has not already, that one clinical teacher in any department will have no more than fifteen students under his care and that this work will be further supervised by a critic, who shall pass from chair to chair thruout the clinic examining the different cases, criticising and aiding the demonstrator in carrying out the different methods of instructions.

Dr. E. D. Coolidge, Chicago:

Just two words, one in regard to the first half of the paper being addressed more to the members of a state society than to the body of teachers. I thought it would be necessary to deal with the subject partly as if I were speaking to operators themselves, and therefore I made the first part of the paper to appeal more to the man who was teaching as if he was a man also practicing, because unless we practice root-canal work we will not be able to appreciate the difficulty a student will have in his attempts to get what we want him to do.

The second point I want to speak of is in regard to what Dr. Webster said about technic. We do have that, but I omitted it because my thought was so intent upon another phase of the subject that the paper grew too long without mention of that feature, and I did not realize until it was being typewritten that I was omitting that part of the teaching. We do in our school have the same form of technic teaching except that we do not do it under aseptic precautions, but I think that is a good thing. The student does all this work on specimens, and I presume they are filed. I am not sure. I believe it is a good point to file them down afterwards to see the result of the filling operation.

THE ANCILLARY SUBJECTS IN THE DENTAL CURRICULUM.

By Guy S. Millberry, D. D. S., San Francisco.

TO fathom, if possible, the future of a broader dental education, to estimate its effects on the dental student of today who is passing thru a transitory period in so far as curricula are concerned, to determine what are really ancillary subjects and what are essentials; these have been the motives which prompted the writing of this paper.

We will all concede that the dentist of to-morrow should be a better educated man. Some of us generalize in that opinion. Some feel that our educational development should incline toward the larger field of general medicine; others believe the added time should be devoted to a more complete development of those subjects which have made American dentistry famous, viz., technical subjects involving digital skill, and a certain number believe that the desired result can be obtained by graduating men who are more capable of expressing themselves well, both in speech and writing, in the English language.

Working under these various beliefs or assumptions we have added to our well established curriculum as prescribed in its entirety, some new and some additional subjects, which might be considered as ancillary subjects, at least in the sense that they are not purely dental.

What *are* the ancillary subjects, the accessory or supplemental subjects, and what relation do they bear to the practice of dentistry? In reviewing the announcements of a number of the schools, we now find specified the following subjects: biology, zoology, splanchnology, syphilology, neurology, physics, general hygiene, pharmacology, mechanical or technical drawing, accounting, military science and English, which did not appear under such identity a few years ago. While they may have supplemented the dental curriculum, I dare say that an interview with the instructors in the various schools would show that in so far as time would permit, all of these except the last two or three have been taught for many years as an essential part of dental education.

For instance, in chemistry we have discussed, heat, light and electricity; in prosthesis and operative procedure we have taught the application of force; in orthodontia we have dwelt upon the spring, the screw, and the lever, all of which are quite appropriately derived from physics. Biology, zoology and splanchnology have been presented in part in the Departments of Anatomy and Bacteriology; Biochemistry in Physiology, Syphilology in Surgery; Pharmacology in Materia Medica, all of which we have considered essential.

The drawing courses are an elaboration of our previous work in the dental technic and microscopic laboratory courses, while accounting is an outgrowth of the business part of the former all inclusive subject, operative dentistry. Military Science and English are entirely new and without doubt are truly ancillary subjects; the former as required at the University of Minnesota is perhaps introduced only to conform to the requirements of the Morrell Land Grant Act of 1862, which provides that universities receiving funds from the Federal Government shall give instruction in military science to male students. (Dean Owre may confirm or deny this statement.) This is not a requirement for dental students in the University of California. While this subject may prove to be of great value today and thus justify the policy and wisdom of Congress many years ago when the law was

enacted, will it meet our requirements of the future if the present grave crisis is decided in the terms we are sacrificing our blood and resources for, a liberal democracy, a free people? Would it not be better to substitute gymnasium, recreational, or sport subjects in connection with general hygiene as an ancillary requirement, that our graduates may be better prepared to meet the heavy demands upon health that office practice makes in our professional work? If we would but make such a change would not these men have a broader vision in life, a larger conception of their civic responsibilities, a greater efficiency in their daily work and perhaps an enjoyment in life that comes only to those who have some time for play?

Academic institutions have not only found it possible to exact a certain amount of such work in their requirements for a degree, but they do so without lessening their standards of scholarship, with, of course, occasional exceptions, and this has been done either by means of endowment or student fees, or both, so that the financial problems are but a matter of planning.

English is important, but not more so than the manner of presenting it to the student, if the results hoped for are to be attained. Personally, I am of the opinion that the Minnesota plan is the most desirable yet presented, with Northwestern a close second. No more effective pedagogic plan has yet been devised to raise the standard of qualifications of the average student, than that which demands a presentation of individual work, which when criticized, returned and corrected gives him the opportunity of learning of his deficiencies. This system is largely responsible for the status of American dentistry to-day. Minnesota is doing the unusual thing in this matter. Universities as a rule do not prescribe English in any of their professional courses, such as engineering, medicine or law, except in so far as the passing of an examination in oral and written expression in English is assumed to be a requirement. These professions are proportionately no farther advanced than we are, if we may judge by the published statements in their literature and the public expressions of their representatives. The University of California prescribes no English in any of its professional schools, other than the passing of subject A, before acquiring the Junior Certificate, and yet every department in the university is confronted with the problem of poorly written papers, supplemented by incorrect oral expression. The writer is of the opinion that the solution of the problem must begin in the low grammar grades where phonetic spelling and pronunciation, both questionable methods, are taught, and where rhetoric, a most commendable subject, is born, in order that the mind may be trained to a correct conception of the larger aspects of professional life, and receive the most effective guidance within the faculty.

There are many subjects taught in the universities, truly supplemental or ancillary in character, which would materially improve the educational status of the dental profession if time and conditions would permit of their study. Psychology, art, history, languages, economics, all are essential to breadth of character and liberal culture, yet ready access by the dental student to such cultural opportunities is usually precluded by the fact that professional schools requiring large clinics are necessarily located in cities, while the academic colleges, in most cases, are located elsewhere to secure the conditions and environment they require. We should look forward to the time when a certain number of electives will be allowed the dental student and the opportunity to study them will be provided in order that our successors may be better prepared than we in the march of progress.

A phase of this problem presents itself in the New York situation as represented in the Board of Regents require-

ment that the subjects of chemistry, physics, and biology shall be included in the requirements for admission. It seems that an arbitrary decision to define a dental curriculum and classify colleges strictly in accordance therewith does not necessarily improve the standards of dental education. I raise this particular question for the reason that these subjects have been spoken of as ancillary subjects, and that, however they may be classed in any part of the country, they are essential to a better knowledge of dentistry as well as a knowledge of better dentistry. Many high schools thruout the country, liberal in character, do not possess the facilities for giving this instruction, thereby prohibiting the graduate from entering upon a career which his more fortunate, but no better educated, neighbor may be allowed to do.

Registration in New York has no influence on student enrollment or graduation in the far West, since only a fraction of one per cent. of western graduates migrate to New York. Conversely, students from registered schools in New York are required, not only to pass examinations for admission, but also for advanced standing in a number of the schools outside of New York State. Such is the fallacy of technical requirements pro and con thruout the land.

In summarizing, let me suggest that subjects necessary to a complete understanding of dental science, either from its medical or technical aspect should not be considered as ancillary subjects and should be provided at some suitable time, during the entire period of higher education beginning in a fundamental way in the secondary schools but not necessarily ending there.

The cultural subjects should be offered as electives, where circumstances will permit, with the exception of English, which should be so definitely prescribed as to produce results conforming to our professional ideals but not necessarily portraying nor entirely comprising them. The development of our curricula in both ancillary and essential subjects should tend toward a general training that will see its full accomplishment after a decade or more of civil practice in professional environment and not necessarily ending on commencement day.

Discussion.

Dr. Alfred Owre, Minneapolis.

Dean Millberry points out that in the past we worked somewhat blindly toward the better education of the dentist, often with varying, if not conflicting ideals. He has classed us roughly in three groups, each laying the emphasis on a different phase of advancement. Undoubtedly this has been the case; we, like all other seekers after truth, have had to do a certain amount of fumbling in the dark. I am optimistic enough to believe, however, that that period is almost past. Dr. Hunter's stirring charges against us gave us a turn in the direction of medicine so decisive that we can never turn back. The necessity for a closer approach to the medical curriculum is now so generally recognized that no school which does not provide it can long hold its own. The need for fine technic in modern dentistry is also so obvious that continued stress on that may be assumed. And, further, as avenues of public service open to the dentists in increasing numbers, the indispensability of the so-called cultural subjects is bound to be recognized. Without the broader outlook of the man educated in life and letters as well as technic we cannot follow up our opportunities. Our problem, then, is not which phase to emphasize exclusively, but how to include all three in just measure with the means at our command. We are compelled to offer them all.

It is quite true, as Dean Millberry notes, that in the past much of this work has been taught incidentally. Yet we must not forget the need for a standardized course which of itself safeguards against lapses from the high ideal of the broader education into the tempt-

ing paths of commercialism. It is not enough, for instance, that fragments of biology, such as zoology and splanchnology *may* be presented in the departments of anatomy and bacteriology. No more can we leave English, the languages, and other attributes of the higher education to the uncertain mercies of the preparatory school. We must make certain in the interests of better dentistry, that the essentials of all these subjects have their definite place in all our curricula. We cannot dismiss a matter so important with a vague trust that a conscientious instructor in one fundamental subject will see that the others are not left out.

Dean Millberry calls attention to the fact that most of our recent ancillary subjects are outgrowths of the older fundamental courses. This is true enough, and quite to be expected. We, like other professional men, must keep up with the times. Without development there is stagnation or retrogression. We must face the fact that until dental education approaches the standard of medical education, there will be more and more demands upon us, in the natural order of evolution. We must anticipate these demands. We must do our utmost to meet them. The number of our "ancillary" subjects is bound to increase with the ever widening vista of opportunities for the dentist. If he is prepared, he may hold, in the future state, a seat of high degree.

NOTE—Military drill at Minnesota is obligatory in all colleges, under the land grant act mentioned by Dean Millberry. Hence it can hardly be regarded as an ancillary dental subject, nor as a proposed subject for gymnasium, sports, or general hygiene.

Dr. Charles R. Turner, Philadelphia.

If I have succeeded in catching the spirit of Dean Millberry's excellent paper, I find in it a conception of what is meant by the term "ancillary subjects" which is entirely in accord with his introductory declaration of a desire to "fathom the future of a broader dental education." According to my interpretation, his conclusion is embodied in the statement that "subjects necessary to a complete understanding of dental science, either from its medical or technical aspect, should not be considered as ancillary subjects and should be provided at some suitable time during the entire period of higher education beginning in a fundamental way in the secondary schools but not necessarily ending there." I infer that ancillary subjects are those which are supplemental and have an auxiliary and cultural value, and that these are recommended to enrich the general education of the dental student and are in addition to the fundamental and essential subjects which constitute the foundation of a scientific dental education. Believing this to be the correct view of Dean Millberry's interpretation of the term "ancillary" (for the matter is partly a question of nomenclature), I am prepared to agree with his conclusions as to their relation to the general educative process resulting in the production of a dentist, but as to their inclusion in the dental curriculum I can not speak with the same degree of cordial acceptance.

If I may utilize the much quoted metaphor of Mr. Herbert Spencer in which education is likened to a cone or pyramid with its broad base represented by the subjects fundamental to all learning, upon which is erected a superstructure with its convergent lines narrowing to the ultimate field of the particular education, perhaps I may be able to make clearer the basis of my view of the matter.

It is a matter of general agreement that the base of this pyramid should consist of a sound elementary education which may be clearly defined in the words of Huxley, who in speaking of the preparation of a student for a tech-

nical education says "his teaching must have been such as to have given him command of the common implements of learning and to have created a desire for the things of the understanding." While the work done in the secondary schools is a continuation of this elementary preparation and its object is a further training of the intellectual faculties for what is beyond, it is nevertheless a fact that in addition to the purely elementary subjects, others of a strictly cultural value and still others utilitarian in character appear, and during this period the lines of our pyramid should and actually do begin their convergence upon the ultimate object of the education. The high school course is essentially preparatory both in the way of a general education or that tending toward a specific end. Certain, indeed many, of the subjects taught in the high schools would be common to both the objects held in view in this course, and all doubtless have cultural value. So it would seem that the shaping of the curriculum may begin as early as the high school career without detracting from its value in the general educative process; in fact it would seem highly desirable that its activities be directed toward preparation for a literary, a business or a professional life. It is quite needless to mention the subjects specifically involved in these callings or even those fundamental to dentistry as the latter have been pretty generally a matter of agreement among dental educators. Certain it is that besides the subjects of general education like English, history, mathematics, Latin, etc., the sciences physics, chemistry and biology are desirable for the future dental student. The former are but the tools of knowledge, the later are the fundamentals of any branch of the healing art.

Acording to our present educational scheme, the pyramid beyond the high school is continued with the dental professional education itself. Time would certainly seem to be lacking to present in this brief period of four years anything but that absolutely essential in the professional education itself. It does not seem just that deficiencies in preparation should be made up at the expense of time legitimately required for the professional curriculum. Nor is it right that the dental educational institutions should be required to assume the debt carried over from the preparatory course. The dental student should begin his professional studies with sufficient fundamental knowledge to be able to understand the subjects of his dental course, and with intellectual faculties sufficiently trained to be able to apply them intelligently in the pursuit of his course. If the high school education is not capable of equipping him to this extent his preparation is not complete and should be continued in the college or university before he begins his dental curriculum. To refer again to our metaphor, a plane truncating the educational pyramid below the professional course should separate this from the elementary and preparatory training. This condition does not exist to-day in any of our schools but it should exist as soon as we can bring it about. At present even the schools that have seen fit to require elementary chemistry, physics and biology for admission still find it necessary to continue the teaching of these fundamental subjects either as the equivalent of the college courses in these topics or as specifically modified for dental needs. I have the firm conviction that these fundamental subjects should be below the separating plane and not above it, and that this is one of the next great steps the dental educational world must take.

At present necessity compels us to pass our plane so that it has not a sufficiently developed base below it, as the preparation of our students is not complete, but do not let us truncate the pyramid any lower down than we formerly did. Do not let us continue these preparatory subjects up into the dental curriculum and speak of them as ancillary

thereto. Let each of us do what we think to be right in supplying this deficiency in preparation, but let us say frankly that this is the assumption of this work only until such time as the responsibility can be delegated to the secondary schools and colleges to whom it properly belongs.

But what of ancillary subjects in the dental curriculum? If we can agree that essential subjects which belong to the preliminary education should be carried by the dental colleges only so long as may be necessary for their delegation to the preparatory school period, are we at all justified in placing in our dental curriculum any subjects which may be considered ancillary to the general education of a dentist in order to enrich his general culture? Surely these belong to the pre-professional period; we cannot assume the task of improving the general education of the dentist however devoutly that may be desired.

What then are we to consider the ancillary subjects of the dental curriculum? Certainly only those which have an intimate connection with dentistry, and not those which have primarily only cultural value whose connection with dentistry is remote. If the dental student could have a knowledge of psychology, art, accounting, public speaking, electrical engineering, photography, or foreign languages, all of these would be useful to him in dentistry, but surely the dental college can not undertake to teach them to him. He should acquire these from some other source. The dental college will be occupied with teaching him dentistry itself.

It appears to me that the ancillary subjects of the dental curriculum must have a more intimate connection with dentistry and greater auxiliary or supplemental value. Such subjects as dental jurisprudence, dental history or comparative odontology for example are not essential to an understanding of dental science but have a direct bearing upon dentistry of admitted importance, and it seems to me that these are the subjects of the dental curriculum which should be denominated "ancillary." If I am wrong in this view of my intrepretation of the true significance of the much quoted term, I may feel with Bacon that "Truth more readily comes out of error than out of confusion."

Dr. Henry W. Morgan, Nashville.

I have had Dr. Millberry's paper in my possession for some days, but there have been too many demands on my time for me to reduce to writing, as I had hoped to do and as I felt it my duty to do, the thoughts that it has aroused within me.

This question of "ancillary subjects to be taught in dentistry," like that of the curricula, is a matter that we must progress towards. One of the most humiliating discoveries that I made some years ago, when I began to devote my attention to the duties of dean of a dental school and had to investigate and determine what was meant by education, was to find that not only dental, medical and other professional training, and in fact all training, was merely a matter of development and growth. That there was no way of narrowing down to particular boundaries, settled or fixed; and that if that were true, there would be no progress in education as well as in the growth and development of the materials which go to make education. I repeat it was humiliating; I had supposed that certainly there had been some things "standardized" in education by this time.

I think the paper that Dr. Millberry has presented to this body is not only excellent as far as its English goes—clear, definite, fine, and right, and, I believe it is the first on the subject that has been presented to us—think it is sane and sound in every particular. I hold we should count as ancillary subjects only those that are correlated with our professional duties but not the subjects that make up the knowledge that constitutes a strictly dental or professional training of every kind.

I disagree with Dr. Millberry in his advocacy of atheltics as a means of physical development. He seems to lean towards military training, and in that thought I most heartily agree with him. I hope the time will come when every student in every dental school, in this country, will have at least forty-five minutes' daily exercise with a rifle and an officer directing his efforts. Limited this would be, it will do all that will be required and take the place of that much desired physical exercise that our students need to arouse cell activity of every kind. Athletics is good, it has done a fine work for those who have been able to participate in its activities, but I am one of those who believe that it makes mollycoddles out of the balance of the class.

The last speaker suggests that we might add photography and foreign languages, and some have gone so far as to indicate that we probably should have as ancillary subjects drawing and mechanical drawing. All of these things are helpful if the time devoted to the curriculum would justify. In biology and histology we are now doing a much needed work in training men to reproduce on paper the things that they see, and in some instances they are doing it with an accuracy that is amazing; and then again, in the case of those from whom we might expect most excellent results we are sometimes humiliated in finding that they make but poor progress, and some are never able to learn to draw. Photography is good; foreign language, as suggested at the dinner last night, better, and let us hope that the time will come when the adoption of these suggestions will become practical. Since the X-ray has been introduced, most of our young men are getting their first lessons in photography, and as its importance increases and grows there will be no lack of time devoted to its higher development. Then we are left to conclude, as Dr. Millberry seems to think, that English is the most important ancillary subject for us to consider. It is the one which we find, evidenced in the examination of our papers and themes of the students, is most needed. The fact that a man possesses the B. A. or B. S. degree is no indication that he knows how to spell, that he has a very great knowledge of rhetoric, or that his English is what it ought to be. On the contrary, many of them utterly disregard the use of capitals and punctuation, and we cannot altogether blame the young men. But certainly our system of education is responsible for much of it. The following is suggested as a basis of a good beginning—and it is held that the course should be given in the Freshman or first year—that the student may put to use in the three following what knowledge he has acquired.

The first half of the year should be devoted almost exclusively to the review of grammar, composition, and rhetoric, using as a text-book Woolley's "Handbook of Composition." In this book the author deals with common mistakes in both oral and written English. Numerous rules governing sentence structure are laid down. These rules are illustrated with appropriate sentences which are carefully studied and analyzed.

Punctuation, capitalization, and letter writings are given careful consideration. Several hours to be devoted to dental nomenclature, their orthoepy and orthography; tracing dental terms back to their origin of Greek or Latin.

Dr. Owre: I want to call attention to one thing, and that is that here is a certain amount of camouflage going on in the dental education today. I am not pessimistic—I am a pronounced optimist; but in the whole business of dental education there is going on at this time a certain amount of definite camouflage. For instance, some of us do not want to include the ancillary subjects openly in the curriculum, so resort to subterfuge. One of our leading educators said, it previously having been agreed to have

technical drawing, elementary biology, and English in the curriculum: "Of course I am going to teach these subjects, but I am not going to announce them as such in the bulletin; I am going to teach elementary biology in all the various subjects presented." This is clearly a dodge; let him assign the number of hours he purposes to use for these subjects; put elementary biology in its true place, and have it taught by a man perfectly capable of teaching it.

As was mentioned by Dr. Morgan, drawing is now being taught in conjunction with the presentation of histology and animal biology; but is the teacher of animal biology teaching drawing or biology? We should call this phase of drawing by its true name, technical drawing, and have it taught by a teacher of drawing who knows his business. And the same in English. The party I have quoted says: "I will teach English in all the four years in all examinations and reports." What kind of economy is that? I grant that occasionally we might call attention to English, but is it the business of the dental teacher to teach English when he is hired to teach his particular dental technic?

Dr. E. H. Mauk, San Francisco.

You must realize that anything I have to say cannot be construed as Dr. Millberry's closing of this discussion, but merely as my own personal impressions.

I thought Dr. Millberry's paper was so clear that one point especially could not escape observation: That is, that in the re-arrangement of our curriculum we are calling things by their true names. We are taking bits from this place and bits from that place and putting them under the headings where they belong. We are always doing this, then why not call a spade a spade—why keep on calling it something else? Teach it where it belongs, let it have its effect and get thru with it and then go on to our centralized teaching. The simile of the pyramid of education is very applicable, I have no fault to find with it the idea of a broad foundation and an apex of specialization. But, for heaven's sake, don't let the pyramid run up to a little tack-point when it ought to run up broad and wide, to a gradual ending. However the question of education of dentists and physicians may ultimately evolve, we as teachers are confronted with the present fact—not a theory, but a present fact—that in many instances the men going out of our schools and practicing dentistry are not well rounded men. They may be wonderful dentists, but are lacking in many things in citizenship and ability to take their places in public life. And if anything is more needed to-day than a civic spirit, tell me what it is. Without this rounding out of character this element is lacking, and I cannot believe but that it is needed in the East as well as in the West. And the responsibility must be upon us. If we take these young men at a time in their careers when characters are forming and crystalizing, concentrate their energies on technical study for three or four years, and then they go out into the world without any further rounding out, where does the responsibility lie except at our doors? It is all very well to say, and I am fully in accord with the theory, that the preparatory schools, high schools if you wish, should afford training in these cultural subjects. That is true, but the man or woman who is going to high school, at least until the very last year of high school perhaps, is not in a position to know what his or her career is going to be, it is merely conjectural. Life to these young people is merely a great adventure, they have not settled down. But when they come to a professional school, when fathers and mothers are making sacrifices for these men and women and they begin to realize this, then life work means something to them. But in many instances these people have not had the opportunity of broader edu-

cation such as we would desire for them, altho that opportunity is open and always has been open; I refer to education in a university. To cite the fact that a B. A. or B. S. degree does not necessarily mean an ability to write and speak perfect English is no criticism of the system; it is a criticism rather of the individual—he has missed his opportunities. We must admit that it is hardly just that a dental school should have to finish, so to speak, polish, the dental student, but we have to recognize the fact, that as things are constituted, it is often his only chance for that polishing; that if these men and women want to go out and take their proper places in the world and realize fully what the responsibilities of life under the strenuous conditions of the present day mean, then they should have the preparation at our hands so far as possible.

Dean Millberry's reference to physical development, I think, was meant as an expression of the idea that physical development should have direction, not necessarily be prescribed. In California outdoor life, athletics, etc., are bred and born in our natures. We all go to the mountains and woods for recreation as naturally as animals do. Therefore physical development is part of our natures, but it needs intelligent direction.

THE TEACHING OF ORTHODONTIA IN THE DENTAL CURRICULUM.

By Ellison Hillyer, D. D. S., Sc. D., Brooklyn.

WHEN your Executive Committee requested me to present a paper at this meeting upon the subject of undergraduate instruction in orthodontia I was prompted to decline for two reasons; First, the subject of orthodontia has been separated from my department for several years, being in the care of Professor Waldron— a department entirely by itself; Second, I am, as rapidly as circumstances will permit, declining to accept orthodontia cases in my own practice. After due consideration, however, I decided to accept the invitation this time for practically the same reasons: First, the major development of the teaching of orthodontia has occurred since my entrance upon the teaching of dental prosthesis and it has been my aim to keep in as close touch as possible with each new development. Twenty-five years ago orthodontia was generally designated as "regulating teeth" and the methods in vogue were such as might be required for the accomplishment of individual tooth movement. Inasmuch as these methods involved the making of appliances of metal or vulcanite, suitable to the special requirements of such tooth movement, the teaching of the subject, by common consent, became a part of the subject of dental prosthesis or, as it was then called, "Mechanical Dentistry." With the progress of time orthodontia became a distinct science, founded upon definite principles, including proper diagnosis, prognosis and treatment. It depended upon dental prosthesis in no way other than in the minor processes of soldering, incidental to the preparation of certain forms of appliances. Having closely observed this development, I heartily favored the separation of the teaching of the subject from any other department—feeling that it would be best cared for by a specialist devoting his entire time and thought to the subject, and fitted by experience to present every phase of the subject in lectures before students, and

by personal clinics and the direction of a separate department staff of instructors care for an ever-increasing clinical practice. Second, it has been my firm conviction that few practitioners can successfully conduct a general practice and orthodontia at the same time and do justice to both. Acting upon that conviction, I am, as I previously stated, devoting my time to general practice. In presenting this paper, therefore, I feel somewhat in the position of an onlooker, ready to offer unbiased opinion upon the way the subject should be presented to the student.

Much has been written of late regarding the proper method of teaching orthodontia. Many claim, as does your essayist, that *it must be a post-graduate study, if it is to be carried to its highest plane.* It is not our province to deal with this phase any more than we need to consider the highest development of the practice of oral surgery, special types of bridge work or any other dental subject, which it is desired to carry to its most advanced stage. Our duty is to give to each undergraduate the *foundation principles in all subjects,* upon which he will build his student and professional practice. No student can be expected, at the end of his course, to be a perfected product, unless he is exceptionally qualified by previous experience or special adaptability and even such a graduate ten or fifteen years later would have advanced but a reasonable ratio farther than his less favored confrere at graduation. Applied to orthodontia, each student should have at graduation a comprehensive knowledge of *the principles which underly the subject.* We have come to an era in dental teaching when the various branches, distinct tho they may be, should be so co-related and interwoven in their presentation to the student as to make the entire subject a complete presentation. The interdependence of the various subjects must be more and more forcefully placed before him. Anatomy, physiology, histology and pathology must join with operative and prosthetic dentistry in giving, in the first two years of the dental course, the knowledge which the student must in the last two years apply in the study of the various forms of malocclusion which he will be called upon to recognize and, in due time, to treat. He must be aware of the effects of various pathological conditions which are liable to cause malocclusion. He must be so conversant wnth the normal type as to make it the ideal which he has constantly before him and toward which he is to work in his correction of the abnormal. His histology will afford him the knowledge of the structures adjacent to the teeth, upon which so much depends in tooth movement, arch development and subsequent retention. His operative dentistry training, didactic, practical and technical, will have fitted him in its special way for the proper care of patients. Prosthetic dentistry will have carefully dealt with the subject of anatomical articulation, so necessary in all restoration, and by means of various metal work technic, prepared the student to properly construct the appliances required at various stages of orthodontic operation.

The plan which has been formulated for this course in the New York College of Dentistry includes 30 lectures in the 3rd year and 30 lectures in the 4th year; 36 hours of laboratory work in the 3rd year and 54 hours of practical work in the clinic, a total of 60 hours of lectures and 90 hours of practical work. The following is the outline of the course:

LECTURE COURSE.

Junior Year—30 Hours.

1. Preliminary outline of the subject of Orthodontia.
2. The Literature of Orthodontia.
3. First Principles.
4. History.
5. Nomenclature.
6. Normal Occlusion and the forces which govern the same.

7. The transition from the deciduous to the permanent denture.
8. Malocclusion.
9. Classification according to Angle and Lischer.
10. The attachment of the teeth.
11. Tissue changes caused by mechanical stimulus or tooth movement.
12. Harmony and Face form.
13. General outline of Anomalies.
14. Etiology.
15. The Alveolus and peridental membrane, from an orthodontic viewpoint.
16. Impression, Models and Plaster Technic.
17. Photographs and Records; their value and uses.
18. Soldering and band technic.

36 hours of Laboratory work on construction of appliances, band making, etc.

No. 1—Make and finish a set of models.

No. 2—Construct and apply upper and lower expension arch with lingual attachment.

No. 3—Make anterior labial expansion arch for bodily movement of molars and bicuspids and lower flat-ribbon expansion arch.

No. 4—Angle pin and tube appliance with Angle-Young latch-lock attachment on upper, and lower working retainer.

SENIOR YEAR—30 HOURS.

1. Preparation of the mouth for orthodontic treatment.
2. Records of treatment.
3. Diagnosis.
4. Arch pre-determination.
5. Dento-Facial deformities.
6. Prognosis of oral deformities.
7. Anchorage.
8. The evolution in methods of treatment.
9. Dynamics.
10. Application and construction of fixed appliances, of all types, for orthodontic purposes.
11. Treatment of Mal position.
12. Treatment of Simple Neutroclusion. Class I. Angle.
13. Treatment of Complex Neutroclusion. Class I. Angle.
14. Treatment of Simple distoclusion. Class II. Angle.
15. Treatment of Complex Distoclusion. Class II. Angle.
16. Treatment of Mesiocclusion. Class III. Angle.
17. Treatment of Unilateral Mesio-Distoclusion. Class IV. Pullen.
18. The surgical treatment of extreme jaw malformations.
19. Retention of all kinds.
20. The problem of extraction or the "compromise treatment."
21. Jackson and other removable appliances.
22. Care of the mouth during orthodontic treatment.

54 hours of Practical work on Infirmary Patients.

This course we feel is sufficiently comprehensive to afford the undergraduate a broad outlook upon the subject and should given him at graduation the necessary ground-work for his after study and development. I have purposely made my presentation brief, feeling that the greatest benefit will come from the discussion which is to follow.

DISCUSSION.

Dr. R. Summa, Iowa City.

Orthodontia has been misrepresented to be a specialty so separate and distinct from dentistry that it cannot be practiced in conjunction with other branches of dentistry. Hence the pernicious questions originated whether orthodontia should be granted any serious consideration in the curriculum of dental colleges and whether it is possible to prepare undergraduates to practice orthodontia with the same degree of skill which they develop in other practical branches of the dental college curriculum.

Occlusion is the basis of the science

of orthodontia. That an understanding, appreciation and application of this anatomical factor is likewise indispensable for the successful practice of every other branch of the science and art of dentistry is past the needs of argument.

The mechanical principles involved in the correction of mal-occlusion are simple and fundamental and not peculiar to only orthodontia. This is obvious to every one who has investigated this subject.

The technic of constructing and placing orthodontic appliances presents no greater difficulties than the technic of other dental operations. In fact, the skill acquired in orthodontic technic is helpful in other practical dental work. What, then, is there so extraordinary incomprehensible about the study of orthodontia that the undergraduate is said to be unable to grasp it?

In a recent discussion before the American Society of Orthodontists two gentlemen claiming familiarity with the conduct of Dental Departments of large Universities, one because he came near signing a contract to teach orthodontia and the other because he had taught orthodontia in one or two of these schools, severely accentuated the impossibility of teaching orthodontia successfully in University Dental Departments. It was argued by the one who admits that he failed in his attempt to teach orthodontia in a University Dental Department that the students do not possess the maturity to study it. Perhaps he is placing the blame correctly; at least he is sincere in his contention. However his statement is debatable because there is every reason to assume that the student body is just as mature for the study of orthodontia as it is for the study of every other subject of the dental curriculum. The misapprehension from which the discussion before that society suffered was due to an attempt to judge the ability and attitude of undergraduates and post-graduates according to the same standard. *Undergraduate instructions are an absolute necessity and post-graduate instructions are a desirable augmentation to the average dentist; while even the genius among us, who needs neither of these, is also an heir to the heritage of ages.* Therefore the post-graduate student who has had adequate undergraduate instructions is best able to choose and perfect himself in those branches toward which his aptitude attracts him.

Various subterfuges have been passed along to serve as excuses and obstacles why orthodontia cannot and should not be practiced conjointly with other branches of dentistry and therefore little or no time should be allotted to it in the dental curriculum. Not uncommon among these are the claim that general practitioners cannot get proper fees for this work and that this work interferes with their other work.

Inability to obtain commensurate fees and inability to prevent this work from interfering with other duties is the fault of the dentist and not of the nature of the work.

The dentist, in turn, is justified in reverting the blame for these superstitions to the dental colleges. Again, the dental colleges have been influenced in moments of inadvertence by the prejudices of those who have entered upon the practice of dentistry before it was possible to impart rational instructions in orthodontia to undergraduates or any one else. These practitioners have been too busy with the established branches of dentistry to bother with this new branch, for orthodontia, unfortunately, cannot be picked up in the nature of points obtainable at dental meetings. I have spoken of "moments of inadvertence of dental colleges" because I believe there are moments when dental colleges forget the part and the initiative they ought to take in shaping the future of dentistry.

Without entering upon a discussion of the advantages and virtues of specialization at this time, let us be mindful

of the fact that every virtue has its limitations. Any branch of the healing art is beneficent in proportion that it is available to the masses of suffering mankind. Any remedial procedure for prevalent diseases which can be entrusted only to the select few, who might call themselves specialists, attracts attention to two possible weaknesses, namely, that it is as yet so poorly understood as to require the ability of a superman or that the material admitted to the practice of a profession is not properly selected and prepared.

Exclusive specialists in orthodontia can locate in big cities only. This makes their services inaccessible to a large part of the population of our country. It therefore devolves upon the dental colleges to teach orthodontia in a manner to enable or induce the young dentist to acquire the same rudimentary knowledge and skill in this work that is required of him in every other branch of dentistry.

A thoro college course of instructions will remove orthodontia from the order of supernatural subjects for in the words of Elbert Hubbard, "the supernatural is only the natural not yet understood."

I wish to compliment Dr. Hillyer on his concise and clear presentation of the subject. I am in accord with his recommendations in regard to the main issues.

The essayist's suggestion of teaching a classification according to Angle and Lischer does not appeal to me, because, personally, I dislike to obscure and confound the logical, lucid and practical Angle Classification of Malocclusion in a maze of verbiage.

I also consider 30 hours of lectures on orthodontia in the 3rd year and 30 hours of lecture in the 4th year a bit extravagant. I believe 16 hours of lectures in each, the 3rd and 4th years, will give the teacher ample time to present this subject to undergraduates. However, I presume that teachers will be permitted to indulge in the freedom of their own thoughts and opinions concerning such minor details and therefore I will not take up any more of your time discussing these.

Dr. S. H. Guilford, Philadelphia.

I agree with a great many things stated by Dr. Hillyer, yet I would take exception to what he has said in regard to the importance or non-importance of certain details connected with the teaching of orthodontia. I have taught this subject for many years and have learned a great deal through my experience and the experience of others. We have to recognize in the first place that as long as this subject is included in the curriculum it has to be taught, and it should be taught as thoroly as time will permit, and by *thoroly* I mean giving it in such a way that the student will have a good general and specific knowledge of the subject.

In the Philadelphia Dental College we deliver a course of lectures on this subject, one each week, to the junior and senior classes. Practically the same lectures are delivered each year, so that the student can get a better idea than would be possible from hearing a certain lecture but once, or going over that portion of the subject but once. The student is made acquainted with all the underlying principles of orthodontia, occlusion and malocclusion, the conditions of the hard and soft tissues, the application of force, the regulation of force, the different appliances used for retention, etc., so that he may understand as well as possible what he can do or what he is expected to do, and what he ought not to do. If he understands the tissues upon which he works and realizes that those tissues have to be impinged upon by the application of force; if he knows what kind of force we can exert and how that force is best exerted, how it must be regulated, how it must not be overdone—when he understands these things he understands the underlying principles of orthodontia.

He must know what appliances have been found best for certain conditions; he must know how to make them, how to adjust and apply them, how to change them, and how to repair them in case they are broken. Therefore in connection with this course, following the regular lectures which lay down the principles involved, we train our students in the making of the various appliances.

Now, for many years I have found that students lack interest in this subject; they are afraid of it, they seem to feel that it is something beyond them, and I always try to get that idea out of their heads. They feel that they will not practice it as a specialty after leaving college, and so they propose to do as little as possible of it in order to get thru. But that attitude is gradually changing. In regard to this matter we must remember that it is not our purpose to try to turn out skilled orthodontists from our colleges. But we do want them to have a certain amount of knowledge of the subject so that the graduate shall not be a failure in this work, but on the contrary shall feel that he can deal with it in a general way at least and sometimes in a more particular way. Many of the patients that need orthodontic treatment are not situated in the large cities where there are specialists. If they were, the problem would be largely solved; but in some cases they live a long distance from the locality in which the specialist may be found. The parents cannot afford to send the child back and forth many times, and in the simpler cases this would seem unnecessary. Therefore the general practitioner should understand enough of orthodontia to advise patients as to teeth which are erupting in improper positions, he should be able to tell the parent what the condition is and what treatment may be necessary; and then after explaining it to the parents, if the case is simple he could probably treat it himself, if more complicated he would advise the parents to consult a specialist for the work. Then again, when the specialist has a case of that kind and the patient lives at a distance, he has to depend on the local dentist to watch the case and make any simple repairs necessary wthout necessitating a long trip to the specialist and back again. If the young dentist cannot do that he is incompetent. He should have a reasonable amount of skill in every branch of the profession. We do not expect a student who has taken a course of surgery in our school to start out and be a surgeon, but he should have a fair knowledge of the subject. But where slight corrective treatment, simple in its kind, will answer the purpose, the dentist should be able to attend to the case, and the more difficult cases he should send to the specialist.

Following out this idea, it has been our practice to teach the student the construction of different appliances such as the making of bands and attachments, screws and nuts, etc., requiring that he make these things himself so that he can in any case repair them if they come to him from another dentist. We make out the list of materials needed, which are put up in boxes and come to us from the manufacturer, one for each student. There are the wires for arches, the dowel and band material, all screws, nuts, etc., all in the box, and the student is required to use this material in making the different appliances. Then under proper instruction he is taught to make the bands, solder, fit them, etc. If he has done the work correctly in the school he will have a good idea of the requirements essential for success in practice. We all have sometimes experienced difficulty in having a broken appliance repaired when the patient lived some distance away.

So we should give our students as much specific and general training in this line as possible, and for that reason I have brought down from the exhibit-room some specimens to show the variety of appliances we require students to

make. If they can construct these appliances they should be able to treat simple cases that come to them.

Dr. F. A. Delabarre, Boston.

It is not usual to discuss the remarks of a man who is not present, but if you will allow me I would refer to what Dr. Summa intimated in his discussion, that the orthodontists are trying to surround their work with a kind of mysterious veil and claiming that it is beyond the power of comprehension of the general dentist. I would deny that statement flatly, and I would make a contrary statement to the effect that there is nothing mysterious in orthodontia beyond the mystery that surrounds all scientific subjects, and I refer particularly to biological questions. In the technic of orhthodontia there is absolutely no mystery, there is nothing that is beyond the skill of the average dentist to accomplish.

Orthodontia is a recognized specialty of dentistry, and, as Dr. Hillyer has said, it bears the same relation to dentistry as oral surgery does, or as rhinology or ophthalmology do to general medicine.

I agree in almost all things with the essayist, but his paper is crowded so full of terse statements that he has not elaborated it enough to make it sufficiently clear to me, and this applies particularly to the course as outlined by him. I shall confine the bulk of my discussion to that feature.

Now, let us view this question of undergraduates teaching in a practical way. What is the situation? Dr. Guilford confirms my own observation that a very small percentage of students have a liking for the subject of orthodontia; they never intend to practice it, and it does not appeal to them. The same thing is true of the general practicing dentist; it is a subject that has little attraction for him, he does not want it. This being the case, and the fact that orthodontia is a specialty, I feel that it should not be taught in an intensive way, but in a general way. Why should we attempt to educate a man in an intensive way along lines of work that he never intends to utilize? In teaching it in a general way the special subject should be given to the undergraduate in order that he may see the relationship between that specialty and his general work and learn the lessons that this specialty is able to give him in practical applications to his own every-day general practice, and so that the undergraduate shall know what is being done and what can be done in an orthodontic way.

Comparing the hours as outlined in the course submitted by Dr. Hillyer with those we give at Tufts College, they are practically the same—60 hours of lectures divided in two years, with about 120 hours of elective practical work in the clinic.

In dealing with post-graduate work, the Forsyth School of Post-Garduate Orthodontia believes the subject of sufficient importance to treat it over a period of thirty-two weeks, during which time we give approximately 560 hours of clinical practical work which includes technic, clinics and demonstrations as well as work on cases, and upwards of 250 hours of lectures on the science of orthodontia and the related sciences.

I make this contrast here in order to show my own conception of the adequate treatment of orthodontia as a specialty, how much is required in the intensive, specialized instruction, as compared with my conception of what is right and proper in under-graduate instruction. The real difficulty of teaching the undergraduate orthodontia as a specialty is the time element. The curriculum is so crowded that sufficient time cannot be devoted to teaching orthodontia to the under-graduate dentist to enable us to make him a safe man to practice it without further experience and study.

To review the course outlined by Dr. Hillyer, of which he has given us the barest possible details: he has speci-

fied thirty hours of the junior course and listed eighteen topics. This outline does not give us any idea as to the relative importance of or the time involved to these different topics, and the same in the senior year. So I would elaborate on this and give what I think the undergraduate must be taught and be able to grasp, in order that he may apply these practical principles of orthodontia in his practice to give his patients that professional service which they have the right to ask and expect to receive from him; to make it practical for the dentist to absorb from orthodontia the things he will inevitably use in his practice, which he must use in order to be a good practitioner.

First of all the knowledge of occlusion. This is essential to the general practitioner. A normal occlusion means the normal occlusion of the infant and up to adult life. And this is applied in general dentistry and gives the lessons of the necessity of contour and contact and the restoration of occlusal surfaces in all his restorative work. And I feel that the profession owes a very great debt of gratitude in particular to Dr. J. Lowe Young for calling attention to the restoring of normal occlusal surfaces. This is only one of the things orthodontia has taught the general practitioner of dentistry. The dentist should also understand the physical laws of mechanics as applied to occlusion so that he may build his prosthetic restorations in conformity to these laws. In another sense, he must know the etiology of malocclusion, and must be able to recognize the existence of the causes of malocclusion in any child presented to him in order that he may take such measures as he may and can to prevent a malocclusion, and advise the mother accordingly. In particular, some instances may be adenoids, the existence of certain habits, like faulty tongue habits, thumb sucking, and especially the habit of breathing thru the mouth, the kinds of foods and the methods of eating food. More particularly than anything else, one of the causes which leads to intensification of malocclusion is neglect of the temporary teeth. The last touches the general practitioner most closely in the practical working out of his own general practice, and he can do a tremendous amount of good to the child in preventing malocclusion by proper care and preservation of the temporary teeth.

Emphasis should be laid upon the diagnostic signs that occur early in life, and by that I mean at the age of five, and every dentist should know what the diagnostic signs are so he will be able to properly advise the parents as to whether a malocclusion is present or is impending. I say at the age of five, because I believe it to be a fact that eighty per cent of children at the age of three have normal occlusion so far as we know. And the other extreme is also a fact, that eighty per cent of adults have malocclusion. So that there must be a time in the development of the individual when malocclusion begins to be manifest. As a matter of fact that time is generally around the age of five, and in most cases we can positively diagnose the starting-point of malocclusion. Therefore each dentist should have that information for his own benefit and for the benefit of his patients.

The dentist should also know the end results of malocclusion, and that facial deformity is the least important of these end results; that malocclusion is a most potent factor which may result in lowered efficiency of all of the organs and functions of the body, in particular digestion; it may result in malnutrition, in a poor general physical development, in a lowered resistance to disease. And specifically again, malocclusion increases the difficulty of maintaining oral hygiene, increases the tendency to pyorrhea, decay, abscesses, focal infection, and all that train of consequences that follow. Malocclusion in reality is a question of impacted teeth. There is not sufficient

growth of the bones to accommodate all the teeth, and frequently the result is impaction. And what does impaction lead to? The nervous reflexes that follow impaction of the teeth are much more serious than is generally comprehended by the dentist. Some of these are common neuralgias, the most intensive form of which is ticdouleureux, then you may go from this down to forms of reflex actions where no pain whatever is present. Pain is not always present in these reflex actions. You may have chorea, epilepsy, and you may have actual insanity following these impactions of the teeth. Now, I do not mean to say, and do not misunderstand me, that the conditions mentioned are common occurrences as a result of malocclusion. They are possible, they are frequently met, so that there is a large list of cases that can be directly traced to impacted teeth. As a profession we should know this important thing so that we may engage the aid of neurologists and alienists in tracing down the possible causative factors of these things and assist them in their work.

As to technic, Dr. Guilford amply covered this point and I will pass over it.

One more point: The parent will ask —What is your advice? You say my child has crooked teeth, would you advise me to have the conditions attended to? This brings up the question of prognosis, and the dentist should be able to estimate in a general way the prognosis of any case presented to him. And he should know that preventive orthodontia is the ideal orthodontia to-day and is being practised, and that the idea of deferring treatment till twelve, fourteen or sixteen years of age, as was the early practice, has gone by. The true orthodontist to-day wants to get his cases at the very earliest manifestation in order to prevent malocclusion because it can be done with much less effort of time and money and nervous strain of the patient at this early age, besides which the results are infinitely nearer the normal.

One other thing the dentist must recognize in regard to malocclusion that bears on the same point, and that is that malocclusion is always progressive, it always tends to become progressively worse, and that the advice of the dentist often given to the inquiring mother—Let us wait and see if it will not correct itself,—is bad advice.

I compliment the essayist on his wonderful paper. I did not want to spend any time in doing that, but Dr. Hillyer will take it for granted that I agree with him most heartily.

Dr. Hillyer: I regret that Dr. Summa is not here because I would not for one minute have the impression prevail that, as Dr. Delabarre has indicated, this is intended to be a hit from the shoulder. I wish that Dr. Summa were here simply that I might get from him the origin of his opinion in regard to this matter of the undergraduate shifting of responsibility. I know of no college that is trying to dodge this issue but perhaps there may be. The point at issue is simply this: How much can be taught, how much should be taught and how much is the student prepared to accept and digest. In one part of Dr. Summa's discussion he speaks of the matter as if we were doing almost nothing and then on the other side he states that our lecture period of thirty hours is just about twice too long. It seems to me that if we have the technical training that the student is now receiving in various departments, we can make these appliances at will and the student can apply them; but where he will be taught is in the very lectures that are to be given to him.

Let me disabuse your mind of another thing. Right straight thru there has been a tendency on the part of a large percentage of the profession to maintain that this special knowledge is not needed outside of the large cities. This is

not true. We must remember that the largest percentage of progress in orthodontia has taken place during the last five years and five years has shown a tremendous change in that field as in all the rest of the subjects.

We would not judge the product of the colleges by men who have been in practice for some time as compared with what will be five years from now. Every year the boys that are going out are better prepared and whether they evade the issue or not is a personal matter. There is no reason why a man going out today should not be able to do most of the things that Dr. Delabarre and Dr. Guilford would require him to do. If he does not do them, that is a personal shirking of his responsibilities. This idea of Dr. Summa that the colleges are dodging the issue I cannot quite grasp and I would like to know where it comes from.

As to the separation of practice and the subject of fees, these matters do not enter into the question here at all. If you want to practice this specialty you can demand the fee that is commensurate. But I feel that if I were to practice orthodontia as I consider it should be practiced, I should bend my whole energy to that; I should devote my spare time to the developing of all the new phases of the subject which are not even considered here. I do not believe that you could get one per cent of your orthodontists to agree that they should keep on with general practice. Am I right?

Dr. Delabarre: Yes.

Dr. Hillyer: I think they are all agreed as to that.

Dr. Guilford and Dr. Delabarre have both referred to the application of physical forces and prior to yesterday morning I think I would have agreed with them. But yesterday morning we had here in this room one of the best conferences that we ever had in prosthetic dentistry, and it is the beginning of a work that we have been trying to do for years. We sat around the table here and conferred and in that conference Dr. Mauk brought, as a part of the subject that he was presenting, a scheme of applied physics that would make it possible to select from all the different subjects those things that are related to the practical application of the physical forces and apply them intensively in a comparatively short course.

I do not quite get Dr. Delabarre's idea in regard to intensive teaching. I should think rather, from the scheme of the thirty-hour period, that this was hardly intensive. It just gives the broad field. The reason there was no division or subdivision of the subjects was because the sequence naturally would be filled out to suit the individual teacher and also it is difficult to say how long the treatment of one particular subject might require because it cannot be stereotyped, therefore when you come to a certain subject it may require twice as long to present it as you had expected.

TEACHING OF PERIODONTIA IN THE DENTAL CURRICULUM.

By A. J. McDonagh, L. D. S., Toronto.

ALLOW me to thank the committee who did me so much honor by asking me to read this paper.

Our College, the Royal College of Dental Surgeons of Ontario, established the Chair of Periodontology some years ago, and I am glad to give you today the impression I have of its usefulness.

When many of us went to college there was nothing taught in our course about periodontia, or if any teaching was given it was tacked on to some other chair and given a very minor place, while many of the elementary subjects, so far as the practice of our profession was concerned, were quite thoroly taught. Many of us could not see the necessity of these academic subjects except as part of our general education, or as mental gymnastics, whereas, had these subjects been connected up with what we were pleased to call practical subjects our interest would have been increased a thousand fold.

Well, Gentlemen, the student of today is no different to the student of ten, fifteen or twenty years ago.

For instance take the study of embryology, the study of the dental follicle or that part of embryology which treats of the origin of the pericementum, how much more interest the student will evince in it if he learns that the first time he is in a dental discussion on the regeneration of the pericementum, he is likely to be told that pericementum if once destroyed can not be restored, because in life there is never more than one dental follicle. He will depend on his teacher to tell him whether that is true or not or what the facts are.

The teacher on embryology will not care to or may not be able to discuss that subject, but the teacher on periodontology must.

The histologist will explain the tissues and cells from a histological standpoint, but someone else must explain how certain irritants find their way into positions which will cause certain cells to leave their normal positions and appear in unexpected places. Following out this idea, the teacher of periodontology will be called upon to explain slides of pathological periodontal tissues and contrast them with normal tissues in order to explain the origin or probable cause of periodontoclasia.

The necessary explanation should be brief because the student has already been shown those slides and the histological significance of them has been taught him, consequently the periodontist simply connects these explanations up with his own subject. A similar procedure to the above will be found necessary with many of the other subjects of the curricula. Consequently the teacher of periodontology must co-ordinate the teachings of practically all the other teachers on the Faculty. He must use in his teachings the information the students have gained from their teachers on embryology, physiology, histology, pathology, anatomy, bacteriology, therapeutics, pharmacology, chemistry and physics, as well as operative and prosthetic dentistry and orthodontia. We are here taking it for granted that the student has already taken up those subjects, so that the teacher has but to apply this knowledge and co-ordinate them with his own teaching.

Unfortunately it is marvelous how soon a student will forget what he has been taught, particularly if he has not had to apply his knowledge. I sometimes ask the student to apply his formerly acquired knowledge to the problem in hand, and if he cannot, tell him to

look up his notes and we will take it up the next day. He always knows it the next day.

What will happen if periodontia is not taken up in the college course but left to be taken up two or three years later as a post-graduate course?

The one all absorbing thought today of all our colleges and of all patriotic citizens is what is best for our soldiers, and strange as it may seem the good of our soldiers is the greatest and most pressing argument I know of that periodontia should be included in the dental college teaching. That it has not been so taught has been and is yet to a certain extent the cause of a very great amount of suffering for the men who are fighting our battles. This is particularly true of the men who are in the trenches—those who are bearing the greatest amount of nerve strain and hardships.

There has been a variety of gingivitis quite prevalent among the soldiers of such a severe character that great numbers of men have had to be laid off in batches on sick leave, and the unfortunate part of it all is that the dentist was absolutely helpless. It took him a long time to find out that it was possible for him to do anything. In fact, I am creditably informed that even now there are some dentists at the front who do not attempt to cope with the so-called trench mouth.

Had periodontology been a subject which had been seriously taught in the colleges from which those men graduated they would have known what to do at once and would have saved those soldiers a lot of suffering and the Allies a lot of man power. They would have known that all forms of gingivitis were for them to treat and to treat with the confidence that their knowledge and skill would effect a cure if a cure could be affected. Moreover had they never been given instructions as to any specific treatment for any particular form of gingivitis, their training thru their lectures on periodontology co-ordinating the knowledge they had acquired from their general course would show them a way out.

How long will a dentist remember the essential fundamental subjects which he has been taught if he does not have to apply his knowledge? From experience, I would say, a very short time handicapped by the lack of proper education. The only kind of practitioner he is ever likely to be will be an empirical half quack, fooled by every advertiser of quack nostrums, as completely as are the most ignorant of the public whom he is supposed to guard and protect.

You have got to inculcate the knowledge and habits into his system when he is a student, if you wish him to be a scientific professional gentleman. Otherwise in ninety-nine out of a hundred cases you will have missed your opportunity and been neglectful in your duty.

Needless to say, a student who has acquired a knowledge of embryology, histology, pathology, etc., mentioned in the last few paragraphs, must have been going to college for some time, in other words he must be an advanced student. That means that we do not lecture on periodontology except to the senior years, the third and fourth years, that appears to me to be the rational thing to do, in fact the only practical way of getting any good out of this course. Tho I believe lectures need not be given to the student until his senior year, I feel that from the first day the student enters the College and takes his place in the freshman class until the day he graduates, he should be impressed with the importance of oral hygiene for the benefit of himself and an example to his patients.

There may be a question, I believe there is a question as to whether a person should be permitted to become a dental student if that person's mouth is actually or apparently in an unhealthy condition. It does not look honest that we should allow these students, who have dirty, unhealthy mouths, to pretend to rectify the mouths of patients who have similar conditions; and there is no

doubt in my mind that the opportunity will ever again arise whereby you can so thoroly and efficiently teach the student the benefits of a healthy mouth as you can in his student days, nor will there ever be a better time in a student's life for realizing the importance of co-ordinating the different subjects he has learned in carrying on his practice, as immediately after those subjects have been taught to him. Therefore I believe in teaching the students to care for their own mouths, and the mouths of their fellow students and to teach them periodontia during their course as thoroly as it can be taught in the short time they are at school. If this is done, more dentists will take up the work after they graduate, ten to one, than if it were left to a post-graduate course.

One of the failures of dental teachers of the past has been that they have not taught their students in such a way, so that when they became dentists they were able to distinguish slight pathological conditions of the gum margin, nor were they able to recognize the causes or probable causes of those pathological conditions; therefore, our course should be so fashioned that the students will acquire the attributes and habits which will result in diagnostic sense (if one may be permitted to use the expression). In order to do that, it is necessary that he should be trained to use and to practice that diagnostic sense while he is a student in the college; therefore, every department in operative dentistry and prosthetic dentistry should be presided over by teachers who realize the importance of training the student to keep the trend of his thought along a prophylactic groove.

Much can be done to teach the principles of this subject and the theories regarding it from the rostrum—that is, we can teach the students according to the present knowledge of the subject, the origin of periodontal diseases, the many causes or supposed to be causes of the different forms of periodontoclasia. We can explain to them in what way bacteriology will assist them in their work, we can explain what objects we have in using instruments, and why and under what circumstances we use drugs and medicines; we can tell them how far the tissues may be diseased before the teeth are hopeless, or a danger to health, and a great many other theoretical practical and semi-practical facts. But we can not teach them in this way how to use instruments, how to apply medicines, or how to prepare the surfaces of the teeth so that we will have the best prophylactic results possible. In my experience, there is only one way to teach students how to use periodontal instruments, and that is for the teacher to use them before the student, and immediately afterwards make the student use them himself. But preliminary to a student using periodontal instruments on a patient, (with the barely possible exception of some of those which are used on the exposed surfaces of the teeth) he should be taken in hand in a laboratory where a manikin would be available and forced to practice on that, he should also be required to plane the surfaces of the roots of extracted teeth while those roots were hidden from view, as for example, when the roots were encased in a rubber tube, having the crown exposed. A good method in this connection is to stain the root and have the student remove the stain with the rubber tube in position, after which the planed root should be taken by the student and examined under a magnifying glass, the demonstrator explaining to him where he has cut too deeply or not deeply enough.

The laboratory is also the proper place for a student to get his preliminary education in prophylaxis. The use of a manikin by a student would save many a tooth and protect a number of infirmary patients.

You can explain in your lectures to the students what you expect the instruments to do, and of course, a teacher can

advocate any kind of instrument that appeals to him, but a teacher teaching this subject should not confine himself to teaching but one kind of instrument, but should explain each different type of instrument which is in vogue today. When the student is thru school it will be his privilege to choose the type of instrument which he thinks best.

While he is at college, either he should be required to get a comparatively simple set of instruments costing not too much, or else the College should supply for his use the elaborate instruments which are sometimes advocated.

Charts and slides are exceedingly useful in teaching this subject, as they are in practically every other subject, but the man who teaches must be able to illustrate on the blackboard to explain some of his points, or the student will miss the connection.

There is one department, in the teaching of this subject, namely, the nomenclature or terminology, which has been neglected, or, shall we say inadequately taught, and perhaps because the Chair of Periodontology has been tacked on to some other chair. Every year, heretofore, we have been using terms which are not descriptive, or which have been misleading in their significance because perhaps we had no better terms to use. Now that there are chairs being established in the different colleges to teach periodontia, I would suggest this would be a good time to have universal terminology in vogue.

In our college, I have adopted in its entirety all of the terms which are sanctioned by the American Academy of Periodontology, taking as a foundation the generic term periodontoclasia or dental periclasia, meaning the breaking down of the tissues surrounding the teeth. Then we have suppurative and non-suppurative varieties to consider and teach. We speak of periclasia rather than pyorrhea, (which is an unfortunate term); we consider the lesions of the periodontal tissues from the simplest forms of gingivitis to the most advanced stage of suppurative periclasia, and we try in using terms to make the term express what it is intended to mean.

Of course, this terminology being comparatively new, will have to be explained most carefully to the members of the faculty of our colleges; otherwise the different members of the faculty will be using the old style nomenclature and the student will be badly taught. A paper read on the subject, by the teacher of periodontology before the faculty, answered the purpose in our school.

Where students have the college only as their instructor it is more easy to teach them the proper terminology than where they are part of their time in the office of a dentist who may have graduated before our standard of education was so high as it is today.

More and more every year, we must be impressed by the fact that if we desire to raise the standard of education or improve the ethics of our profession, it must be done thru the dental colleges which are turning out young men year after year to reflect the teaching and training and to a great extent the personal bearing and character of the professors of their Alma Mater.

An unfortunate condition exists among dentists in almost every locality, which is due to the lack of teaching periodontia in the colleges; inasmuch as the dentist not being able to intellegently cope with dental periclasia, and not knowing what to do for his patients, is at the mercy of all sorts of exploiters who have some nostrum to sell, some "Sure Cure for Pyorrhoea" or some apparatus which will do the work without any labor on the dentist's part. This condition of things would be almost entirely eliminated if the dental student received thoro instruction while he was at college. Let the student be taught that periodontal lesions are amenable to treatment by rational surgical methods, that it is not necessary to be the possessor of any secret formula or any closely guarded,

peculiarly shaped instruments; but that all he needs is a little extra diligence and care. If he has the proper qualifications, and most students have, let them learn these facts and they will go out into the world as dentists, ready to attempt and ultimately succeed in treating every ordinary case of periodontoclasia which presents itself.

He will then be a credit to his profession and the greatest possible good to the community to which he belongs.

Discussion.

Dr. J. O. McCall, Buffalo.

I wish first to compliment the essayist on his paper, and to say that if its discussion necessitated disagreeing with any points brought out by Dr. McDonagh I would have to sit down at once, because I do not find anything in the paper with which I can or wish to disagree. Everything in it suits my ideas in regard to the teaching of this subject, and I have only a few suggestions to offer in addition.

While I will make my remarks as brief as possible, I feel that we really should not be limited in time for discussion of this paper because periodontia, in which I must also include, as Dr. McDonagh hints in his paper, the teaching of Oral hygiene or prophylaxis, I consider the dominating subject in the dental curriculum. This statement will probably arouse quite a bit of protest among the teachers of other subjects, but I think you will all agree that periodontia is the most important subject outside of the one that you yourself are engaged in teaching. That being the case, the opinion expressed is made unanimous. We are dealing with the health of the mouth as a whole, the soft and hard tissues. And we cannot make this the dominating subject of the curriculum unless we give to its consideration a sufficient amount of time and secure for its presentation a teacher whose ability is on a par with the best men we can get for any branch of college work.

There is no more mystery in periodontia than in orthodontia. In the past there have been some misconceptions due to lack of understanding among the specialists themselves in regard to the correlation of various etiological factors and the classification of periodontal diseases. At the present time I think that those of us at least who are engaged in the actual practice and specialization of periodontia feel that we are no more dealing with mystery than is the orthodontist in treating his subject, and we are able to explain to our students quite as clearly the underlying principles involved in this subject as is the orthodontist.

In order to divest the subject of any possible mystery, we must in teaching clearly differentiate the various types of periodontal disease. We cannot say that we have one disease, pyorrhea; we have a group of related diseases and that group has definite basic types, and every case that presents itself for examination can be analyzed showing which one or two or three of those types are present in that mouth or on that tooth. So we must be able to teach diagnosis in the way of elucidating the different kinds of periodontal disease with which we have to deal. We must also simplify the etiology, and to this end we have divided the etiology into six groups of causal factors. Those I will not take up in detail, but will be glad to communicate with any one who is interested personally on that point. If we can teach our students the basic type of disease and the basic causes involved, then we will enable him to diagnose those cases, just as he will be able under the teacher of orthodontia to diagnose types of malocclussion.

Another factor as important here as in the teaching of orthodontia, a point which so far as I know has not been brought out before, relates to the division of periodontic cases, into two different

classes according to the difference in equipment and ability of the general practitioner on the one hand and the specialist on the other to cope successfully with cases of periodontoclasia. We should ask ourselves, Is this case one that the general practitioner can handle, or should it be referred to the specialist in order to get a successful result? We should teach the student what the general practitioner can and cannot handle. Then when these cases come he will say, "This case I can treat, I can prevent; the other I cannot. Go to the specialist if you can,— if not then we will try to do what we can."

We must have harmony of teaching in this as in other branches, and I know of hardly any branch in dental teaching in which there is a greater lack of harmony than in the presentation of the subject of periodontia. This shows very clearly the necessity for a conference of teachers, which I had hoped to bring about in an informal way at this meeting, and the need of harmonization of their ideas and presentation of those ideas to the students so that general practitioners may have their more or less chaotic conceptions of periodontia cleared up, and the various state boards make the subject sufficiently uniform so that a student, in going from one state to another, can have some chance of passing an examination on the subject.

In the teaching of periodontia the presentation of the subject may be divided into three headings:

First: Impressing upon the student the necessity, the realization of which he will carry with him into general practice of making an absolutely thoro examination of the soft and hard tissues. He must examine the soft tissues just as thoroly as the hard tissues in order that he may detect variations from the normal in their incipiency, not after becoming thoroly and deeply established.

Second: We must teach the diagnosis of these abnormalities, the determination as to what kind of disease we are dealing with and what the causes of that disease are.

Third: We must teach prevention:

(a) Thru the protection and correction of predisposing causes,

(b) Thru the teaching of the necessity (not the desirability, but the necessity), for health, of normal occlusion,

(c) By the securing of a normal circulation thru the soft tissues about the teeth, from the standpoint of local conditions and also that of the quality of the blood which is being brought to the tissues of the mouth by the general circulatory system, and,

(d) By the establishment of thoro cleanliness of the entire mouth.

Dr. McDonagh: I just want to say that I kept as far away from the subject of technic as possible and tried to hold myself down to the consideration of the one task assigned to me, to-wit: Whether periodontia should be taught in the schools or not. I say I tried to stick to that, and to this end avoided describing the course presented at the Royal College any further than to give our reasons for teaching the subject.

I expected that Dr. McCall would pull my paper to pieces, but he did not.

I have been instructed to bring before this meeting the matter of charts; that is, charts which are to record operations, etc., performed by the graduate. Graduates are always influenced in their methods of practice by the methods used in the college in which they were students, therefore if the different colleges of the Institute could adopt a practical form of the chart which would be used by all in a short time, dentists all over the country would be using the same kind of a chart and a patient could take a copy of the chart to any dentist on the continent with the assurance that the dentist would understand it. I ask, therefore, that this question be taken up.

REPORTS AND PAPERS OF THE SECTIONS.

SOME ESSENTIALS NOT TAUGHT IN TEXT BOOKS.

Richard L. Simpson, A. M., D. D, S., Richmond, Va.

(Read before Section I, Dr. A. H. Hipple, Chairman.)

OPERATIVE Dentistry is the foundation of our practice, therefore the course should be a broad one. No effort should be spared to make it as human as possible. No detail should be slighted, as success in operating depends upon a series of accomplishments. Publishers tell us that few dentists ever buy text books after leaving college, therefore our lectures are a great responsibility. Hobbies should not be ridden, at the same time honest convictions are like summer showers to growing crops.

Our teachers are earnest and conscientious, but we should not be satisfied with our product. What percentage of dentists do good work? Personally I do not believe twenty- per cent. do. *One in five.* Your observations will convince you that this estimate is generous. This paper is no attack on schools, neither is it pessimistic. I have made it the rule of my life to honestly look at my own and our handiwork. This necessitates many changes, and many adjustments. Let us do what we can to increase the efficiency of our product and be of mutual help. We have made wonderful progress in the last twenty-five years, but what is the trouble with this distressing four out of five which has been mentioned? They left college with high ideals, certainly the great majority of them. Why did they fall by the wayside? We taught them how to do the work of dentistry as we knew it each year, but *we did not teach them how to defend themselves and how to grow,* hence the public in general receives poor dentistry and dentistry in general is rated low socially, intellectually, financially.

The creative or constructive mind is sensitive to criticism. So also is the artistic. Since dentistry requires both talents you can readily see the troubles ahead of the beginner, and especially since the public is in rebellion at having dental work done at all. Explain this to the student as a fact just as you explain how to make an inlay or remove a pulp. Explain it with a smile. For heaven's sake don't growl about it. Warn him that the public rebels at Removal of Caries—Proper Cavity Preparation—Rubber Dam—The Engine Itself—Time Consumed— Waiting for appointments, etc. Explain that the public will want to rush him in almost every case, that most patients think themselves your only patient and will plead for haste just this time. Tell him how tiresome all these things become, how the actual work is not what gets on his nerves but these things, the next patient waiting impatiently, the telephone and interruptions. Teach him self-control, patience, perseverence, and still again patience. Don't fail to tell him that our work in many instances requires doing things over and over again. He must fight to retain or cultivate the faculty of concentration. Constant complaints will tend to lower ideals, and a student should be made to feel down deep in his soul that poor work is dishonest, just as much as a highway robbery and forgery. Stolen money can be replaced by other equally as good, but lost teeth cannot equally be replaced. These things being so, your talents as teachers must be of the highest order to warn against these disagreeable facts without discouragement, and at the same time whet his desires to do a disa-

greeable but extremely important and interesting thing, and do it for the good of humanity, do it for his personal satisfaction. Teach him to work earnestly, seriously, proudly. It is as great as any work in the world, just as important, and requires the greatest versatility of talents. Teach him to play this game cheerfully and like a man. *Dentistry requires the best there is in the best man.*

We seriously weaken dentistry and lower the ability of each graduate every time we dismiss a graduating class uninstructed in regard to individual fees. Since Operative Dentistry is our foundation, its fees should be in proportion to those of Crown and Bridge Work, Exodontia, Orthodontia, etc. The curse of Operative Dentistry is the public mind that revolves around the dollar amalgam filling. The public will appreciate and pay when it is instructed in Proper Cavity Preparation, Cement Linings, Contour, Occlusion. The public must be instructed or there will be no good operative dentists for the public, since good dentists will be forced to specialize for the sake of the specialist's fee. The public gets what it pays for and we must see that each student appreciates the importance of perfection in each detail, and so stiffen his backbone that he charges for it or his work will inevitably deteriorate. Most dentists are unfortunately afraid of their patients anyhow. The dental nightmare is the fear that patients will not return, hence the too low fee. The laborer is worthy of his hire. While all prices are soaring just now, you must advise him to increase too. Fees were established when only carious material was removed and the resultant hole filled with something. We have progressed to Black's Cavity Preparation, but fees have not. Formerly a patient would climb into the dental chair and grin and endure the preparation of a cavity. Not so now. We have progressed all along this line and then progressed from phenol and burrs by the gross to conductive anesthesia, but fees have not progressed for the average dentist, and *no profession is better than its average man.* When the occasion arises the patient must be informed that there is as great difference in the quality of dental service as there is in shoes, automobiles and everything else. The two best materials for filling teeth are ability and character. *Increase in quality must have a corresponding increase in price, or you penalize excellence.*

Fear of the patient is the primary reason, and low fees are the secondary reason for leaving carious dentine in cavities, and bad cavity preparation in general. This is a subject you must handle with gloves off. No mollycoddle manners about this, Billy Sunday it. This will give a splendid opportunity to distinguish between caries and decalcified dentine. The student should be shown as well as told. Right here let me advise you to keep both eyes on your infirmary demonstrators. Devote some time to the psychology of cavity preparation. The student really needs some very intimate help and encouragement here. A dentist hates above all things to be called rough. To a patient all pain is rough. Breaking down enamel requires force, and any force is rough. The more perfect the cavity preparation the more force and time required. Patients complain of time consumed so you speed up, and slight force with speed is rough. As work increases in quality reputation increases in spite of growls about roughness. The other dentist does not like to hear of this good quality, so to his shame he replies, "Yes, but he is pretty rough, is he not?" So there you are. The student must be taught to explain to his patient these things if necessary, to give them notice, not warning, of the approach of force, to show sympathy for them without being familiar or affectionate and above all not to be jealous of the other man's reputation and good work. A knock at good work lowers the standard of our profession. He should

go out of his way to compliment good work. He must make his patients take him seriously and take his work seriously. While doing all this he can do the work so joyously that his patient will be interested and overlook what is of necessity to some extent rough. While impressing upon the patient the importance of removing all caries he should remove the least sensitive of it. Let him not knock his fellow dentist who left caries, but be content to impress the importance of its removal. This strenuous attack on the leaving of caries calls for a warning against a brutal removal of good tooth substance. Here is where your ability as a teacher comes in, to impress profoundly but not let him go too far in the other direction. Another excuse for leaving caries is the sensational advertisements of the so-called white copper cements with their wonderful (?) antiseptic properties. Unfortunately these advertisements destroy years of faithful teaching on careful cavity preparation and consequently do a great deal of harm to the public. They are not copper cements any how, and in the lecture true copper cement should be shown to impress the student. Unless extra care is used to differentiate the student's mind is over balanced by the constant advertising. In every operation strive to attain the ideal. No one else has a better right to make a perfect piece of work. Perfection is never attained by putting a filling or inlay over the other fellow's work. The other fellow may have left caries. Caries cannot be detected by burs, and the last layers should be removed by sharp excavators. Concerted effort should be used to induce manufacturers to make Black's Spoons much thinner so they will cut. It is distressing how many dentists do not know how and when to sharpen excavators. They should be sharpened for each case as needed. Not all at once, but as each one needs to be sharpened, sometimes two or three times in each cavity. This comes as a rude shock to students, hence the necessity for stressing it. The progress made in office equipment, radiography, anesthesia and the so-called theoretical branches is splendid and necessary, but we must remember that all these are but means to an end and this end is perfect dental technic.

The nightmare of dentistry is the fear that the patient will not return. This has been mentioned also as the primary reason for poor operating. It is no calamity to lose a patient. It is often a compliment. Better lose some patients rather than lose your peace of mind and self-respect or lower your ideals. The other fellow loses them too. No one man can work for everybody, so some are certainly left for the other dentists. In this lecture show the fallacy of competition and urge co-operation. The other dentists are friends, not enemies. Tell him to call on the other dentists as soon as he locates and ask for their overflow. It is the strictly proper thing for the other dentists to call first, but it is this waiting for them to call that engenders the first ill feeling. Dentists are not good callers, and it is most emphatically best for the beginner to call first. He must not try to show off or appear wise. Let him appear humble.

There is something about the practice of dentistry that is unsatisfying, making you feel that your work and talents have been in vain. Two reasons bring this about, first, the public has a distinct dislike to dentistry and seems to think it smart to cultivate it, whereas it surrounds all other true professions with a kind of halo. Second, we teachers do not make these halos for our best dentists. We should speak of them with pride and make our lectures living things, freely sprinkled with the names and methods of our living men who are contributing to our growth and excellence. Even our geniuses will tell you that it is a rare thing for other dentists to compliment them. How seldom do we hear an unqualified compliment from

a dentist. Is it fair to dam with faint praise the redeeming one out of five?

On the walls of practitioners of other learned professions we see pictures of men who have made and are making those professions. Do you see pictures of dentists? The absence of pictures of instructors from the walls of dentists is a crying shame. Instructors is used in its broadest sense and not confined to colleges. It indicates ingratitude and ingratitude is the the meanest sin in the calendar of sins. This is especially heinous since no other profession requires more personal touch to impart it. For thirty years dentists have been so generous with their knowledge that others demand this knowledge as a divine right. Any knowledge that relieves human suffering should be freely given, but it should be received gratefully. We must see to it that our coming practitioners appreciate dental worth and reverence it. We must see to it that they themselves deserve appreciation and reverence.

Allow me to suggest that your lectures can be more readily absorbed if you group your reasons, advantages, disadvantages, etc. Let me illustrate. There are seven chief reasons for using the rubber dam:

1. Perfect view of cavity.
2. Excludes moisture.
3. Excludes blood.
4. Less sensitive.
5. Keeps drugs and canal instruments out of throat.
6. Prevents infection.
7. Permits accurate adaptation of filling materials.

It means little to a student to see this in straight printing or to hear it in ordinary conversation, but this numbering and grouping fixes it in his mind.

At the beginning of the session warn him against too early marriage. Four years at college and contact with the public gives him an education, and contact with the right kind of people gives him culture. At the end of three or four years of practice he can marry a much higher type of girl. Poor and uneducated girls are not the only pretty and lovable ones. Make him have a proper respect for himself, his education and his calling. *The greatest thing in the world is a fine young man with possibilities.* Fathers and mothers of fine college bred girls are praying for such a son-in-law. Why then love and marry beneath him? He must be reminded that he is growing, and will continue to grow, while the girl without education stands still after marriage. By all means warn him against affection for infirmary patients and the usual college neighborhood girls. It is pretty safe to marry among the successful professions. Daughters of physicians and ministers make admirable wives. At least marry a girl who has college training or its equivalent in culture or he will marry beneath himself. He owes this to himself. He owes this to his profession. A wife with wealth makes it possible for the right sort of dentist to help his profession grow because he can afford to give it more time.

Dentistry is really only about one hundred years old. For seventy years we devoted our energies to become the best dental mechanics in the world. We succeeded. For thirty years we have worked to be acknowledged as truly professional. The world admits our mechanical ability and is about ready to acknowledge our professional standing, but we have neglected an equally important part of life, viz., good citizenship. We have had our hands so full of the two other parts; and it takes so long to do dental work, and its small remuneration per hour does not enable us to make much of a showing; and the sensitiveness of being hurters have all kept us from doing our duty to our City, State and Country. This war has shown that there is present in our profession a splendid citizenship. This should be our next great task, and in mastering it we will automatically remedy most of

the evils under which we now groan. Our intimate and prolonged contact with the public should make us broad minded. We must be informed on general subjects and by this means prevent people from talking shop to us when in social contact. We must improve our condition until the best dentist in any city or community has as good financial standing as the best lawyer or physician.

The human race advocates only by the extra achievement of the individual. It is this extra achievement I am trying to impress upon you today in order that you may impress it upon each student.

REPORT.

Dr. A. H. Hipple, Chairman.

Section I had a very interesting and a very enthusiastic meeting. The attendance was good and those present had the pleasure of hearing an excellent paper read by Dr. Richard L. Simpson on "Some Essentials Not Taught in Textbooks." So enthusiastic were the members present over this paper that each one wanted a copy at once to take back to his faculty, and a resolution was unanimously adopted asking me to arrange to have extra copies made. I have done better than that and have arranged with Dr. Simpson to have a copy sent to the professor of operative dentistry in each of the schools belonging to this Institute, within the next few days. After you have read this paper you will understand why we had such a good meeting.

SYSTEM IN TEACHING PROSTHETIC DENTISTRY.

By Edwin H. Mauk, D. D. S., San Francisco.

(Read before Section II, Dr. H. L. Wheeler, Chairman.)

THE title of this paper may suggest to some the attempt to apply to this highly technical branch of our art, the methods of the efficiency expert, or it may seem to smack of the widely advertised correspondence course of the common or magazine variety.

Neither of these, extremely useful as they are in their fields, have been the incentive to the writer hereof to unburden himself of the observations following.

However, both may have had their part in his subconscious mind in stimulating an effort toward an orderly arrangement and application of the diversified fragments of knowledge gradually acquired by accident or intention, thru years of association with the subject while endeavoring to impart some of its principles to others. Indeed, one cannot fail to be impressed by the lack of efficiency of the average student, and his fearful waste of the time at his disposal in purposeless and ineffectual movements, even tho he feels he is putting his best into his work. Seeing this waste of time, and with it energy, it may well be that in the near future we shall find it advisable to include somewhere in our curriculum a study of co-ordinated motions correlated with brain reflexes. This might appropriately come in our new course, Applied Physics.

Already we see an application of these principles in the work of the Gilbreths, and others, in the teaching of partly disabled soldiers to take up new and wholly unfamiliar vocations, oral hygiene among them. In many instances entirely new series of brain reflexes are established as well as the physical motions necessary in the performance of the work.

But before we apply any system to

teaching, we must know exactly what we want to teach, and settle definitely whether the thing we are going to teach is useful knowledge. It may prove to be merely so much mental junk, which, unlike that which accumulates in the garrets and basements of our homes, unfortunately is not so conveniently dragged out and disposed of, but remains to clutter the mind, perhaps to impart its own mildew to new accumulations of really useful facts. Right here is need for fine discrimination, lest in our ardor for the immediate practical application of all our teaching material, we may omit that which has its correlative value in giving more than one aspect of a problem.

For instance, a student may be so trained technically as to be able to execute a beautiful bridge, without any conception of the pathology of degenerate apical areas and traumatized gingivae, or the significance of faulty articulation. He might be termed a dental jeweler, but not a prosthesist.

On the other hand it is obvious that to produce a technically skillful prosthesist, it is neither necessary nor desirable to require the student to make technic specimens of obsolete replacements, nor to use processes that were abandoned for something better about the time he was going from knickers into trousers. One of our instructors at one time insisted that the students learn to do all of their soldering with a mouth blowpipe. He was a jeweler, by the way, before he took up dentistry.

How then shall we define the boundaries of our teaching subjects?

First:—By careful selection of the subject matter for its practical value in present day dentistry:

Second:—By elimination of obsolete ideas and superfluous details, also duplicate methods in laboratory procedure. On what remains the teaching effort should be concentrated.

To offset the possible narrowing effect of this vigorous pruning, reference may be made in didactic teaching to dental history sufficient to furnish a background to the student, against which will stand out in his mind a concept of that which is Dental Prosthesis today compared to that which was "Mechanical Work" yesterday. In addition, comparisons should be made of other methods and processes in vogue, with reference to their merits and demerits, to enable the student to judge of the soundness of the teaching he is receiving, and allow him to feel that his horizon is not fixed by the traditions of his school, nor the personal prejudices of his teachers.

Third:—Evolution of new methods. In this as in other lines of human endeavor, the aid of research must be invoked, in order to place dental prosthesis on a foundation of scientific facts.

Research is synonymous of experiment, thru it empiricism becomes science.

The dentist must cease guessing, for instance, that four teeth will do their own work and that of ten other teeth besides in a bridge from molar to molar. He must *know* that those teeth will prove unequal to the task just as he will himself fail if he tries to do three men's work every day. He must cease hoping that by some miracle or special dispensation in his favor, such a formula as: "A bowlful of plaster, a dozen or so of porcelain teeth, two sheets of rubber, a cup of water, mix, add salt to taste, and cook in a moderately hot vulcanizer" will produce an efficient masticating apparatus, one that will "bite corn off the cob" or "take a chaw off a plug o' terbacker."

He must *know* the limitations within which he can obtain beneficial results, and *know* how to take advantage of every favorable condition both in the field of his operations and also in the materials and appliances with which he must work.

We must recognize the fact, that in a broad sense, all of dentistry, except such subjects as dental pathology and therapeutics, prophylaxis, and oral surgery, is

prosthesis, inasmuch as it restores a lost part.

If we consider a single tooth a "part" in the sense that it is a human organ, then, of course, the restoration of even a portion of such an organ lost by disease (caries in this instance) is replacement; i. e., prosthesis. That branch of dentistry, however, which is concerned with tooth cavities has been arbitrarily termed operative dentistry, in distinction to prosthetic dentistry, the art of restoring the lost tooth or teeth as entire units.

In Dr. G .V. Black's writing, grouped under the heading Operative Dentistry, we have a complete system which the dentist may follow with the assurance that it will meet his every need along this line:—that its methods are proven, and scientifically sound, and that there are no gaps in the detail of the physical actions and movements necessary to accomplish the desired end, i. e., successful filling operations.

When we turn, however, to so-called prosthetic dentistry, what do we find?

"Systems," for this, that or the other, impression, or plate, or crown, or bridge we have a plenty, named after the originators, plagiarists or most vociferous itinerant teachers, but no complete, detailed summing up of scientific facts. No system exists which within itself suffice to accomplish the replacement of one tooth or all the teeth, as the case demands, with due regard to the prevention of further loss, utilization of favorable anatomical and physical conditions present, and the correlation of small partial restorations with complete restorations of the entire denture.

Such a system there must ultimately be, if dental prosthesis is to be conducted with the same orderly sequence of details as Black's work has made it possible to apply to filling operations. It must be said that recent text books present evidence of a long step in this direction, and in this thought of an ultimate system we must of course, recognize that every man who has worked out a so-called "Technic" of any phase of prosthesis, has contributed a part toward such a system. Any "Technic" is the expression of an effort toward system, and may be complete in itself, without bearing any relation to the next problem encountered in the restoration of the same denture.

Dr. Black, no doubt found such conditions; indeed we are led to think that it was largely this very diversity of methods which prompted him to test conflicting ideas, reject the impractical, utilize the logical and sound things, and even to develop new methods in the instances where those already in use did not measure up to his standards.

Probably the chief obstacle in the development and establishment of such a system is the great variety of technical and artistic processes embraced in its field. Dental prosthesis draws so largely from the arts and crafts that he who would weld all its diversified elements into one universal text must be versatile indeed, scientifically trained, and yet endowed with an intensely practical mind. All these qualifications he must possess if he is to produce such a text as dentists and dental teachers can and will accept in the course of time as authoritative and sufficient, just as they are accepting Black's work because of its unassailable truth, and well tested processes, once they have comprehended it and mastered its principles.

While awaiting the advent in prosthesis of a Black to do for it what he has done for operative dentistry, we can at least by concerted effort contribute largely to that desirable final object. Thru classifying and segregating the knowledge already extant, eliminating, improving where necessary, evolving new processes where nothing seems to quite fit the needs, we who have to do with teaching can make this knowledge more available, more widely diffused.

What constitutes prosthetic dentistry in Illinois? In Massachusetts? In

New York? In California? In Texas? In Ontario? What relation exists in the teaching of the Art in these various sections? How can a student be assured in one place of getting an approximate total of what is taught in the others?

It would seem that only by closer coordination of curricula can any such right be assured to the student even in a moderate degree. While this paper was being written, no less than five different candidates, for our State Board of Examinations, graduates from as many different schools, came to the writer for information on the technic of making a "Standard" crown. This may be more widely known as a "Plate and Post" crown and the name Standard may indicate the insularity of our schools and our State Board. The point is that the graduate from the school which has the best reputation of the lot (no better school exists, in my estimation,) said that he had never made such a crown and had never heard of it, but that he had specialized on the making of dowel crowns with a band. (The Richmond type.)

In dealing with this situation a real live commission composed of representative teachers from various sections of the country could accomplish great headway, provided each of its members would do his share, instead of letting the other members do it, and providing his school were not so hampered by personal prejudices or by its economic conditions that it could or would not accept the findings of the commission.

This may be "old stuff," but if it is, what are you going to do about it? Simply because it has been tried and has brought no results, are you going to sit still and let well enough alone, or do you refuse to admit that what is good teaching in the East and West ought to be good teaching in the North and South also?

An eminent economist recently observed that the great problem of this age is distribution. Distribution of natural resources, agricultural products, of manufactured articles and of knowledge. Distribution of knowledge assuredly involves didactic teaching, tho such teaching is by no means the only or best channel for diffusion of knowledge. Visual instruction, manual training, and the plentiful use of teaching models, must all play their parts in teaching our highly specialized subdivision of human knowledge.

A system which will stand the acid test of teaching dental students will in most details stand the test of use by practitioners, unless the teacher be too much of a pedagogue and too little of a dentist. As a modest contribution to such a system, may the writer be permitted to present somewhat in detail a description of some of the concrete results of his work along this line.

My conception of the teaching plan of some of the early English Universities is that the students were left to their own responsibilities to a great extent, associated with their tutors rather intimately in dormitories and outdoor life, and held to certain requirements in recitations and essays, being expected to gain the necessary knowledge from their books or tutors in their own way. This was the condition existing to a great extent in many of our dental schools up to the last decade or so, the student being required to do certain prescribed things and allowed to get this work done as best he might. In the meantime he was referred to certain text books and listened to lectures of various kinds presumed to aid him on his struggling way.

The largest net result of this system being that he often got more from advanced students and outside dentists than from his school, the school's chief function thereby became one of supplying the environment for study of a kind, and furnishing the final authority for him to pass from a condition of paying for the opportunity to practice on patients to one under which they began to pay him for

practicing upon them. Hence the term "Dental Practice."

Several years ago the writer arrived at the conclusion, quite advanced it seemed to him at the time, that we ought to have rigid requirements for the student and then assist him by every legitimate means to meet those requirements, so that the teaching might come from the top instead of from the bottom.

On this assumption we began to build. It was felt that to assure technical skill, laboratory technic, popularly despised under the term "Dummy Work" was needed in large doses. But we determined that we should concentrate on one good method of doing each thing, not make the victims do a piece of work by a perfectly good procedure, and then do it over again, merely for the sake of the training involved, by means of another procedure which might be bristling with difficulties no sane dentist would undertake to overcome.

The selection of technic work was likewise made under the primary consideration of its relation to practical work upon patients, to be taken up later in the course, and also to be administered in large doses.

Didactic work consisting of lectures, recitations on prescribed portions of texts, and quizzes of general character was also arranged so that the lectures would either slightly precede the work in hand or proceed with it, not taking up crowns for instance while students were making casts and vulcanite work or vice versa.

Another pressing need had to be met: Students find it difficult to form a conception of prosthetic structures without tangible example of the things they have to make. So the production was begun of a series of teaching specimens or models showing progressive steps in construction, actual size.

Nowadays in our school, when a student is required to make a piece of technic work, the corresponding teaching model is displayed in the laboratory during the time allowed for the piece, usually one month. At the time assigned for beginning the work, the class is assembled in a room which we call the Prosthetic Clinic laboratory, which is fitted with a dental chair, engine, laboratory bench, polishing lathe, draw press and rolls, casting appliances, vulcanizer, in fact practically everything pertaining to prosthetic work as it would be carried on in a regular office. Portable seats, circus style, arranged in tiers, in the shape of a V are provided for the students, with the demonstrator between the extremities of the V.

At this time each member of the class received a mimeographed sheet of instructions covering the technic and the Instructor or Professor devotes the hour to explaining this, in detail, together with clinics interspersed with "Chalk Talk." Next, each student receives a laboratory technic card, indicating definite steps in the technic in their proper order, each of which he is required to have checked by the instructor before proceeding to the next. This prevents mistakes to a great extent, and when mistakes are made permits them to be corrected without reconstructing the entire piece.

During this period, the lectures and quizzes proceed. Co-ordinated as nearly as possible with the nature of the technic pieces under construction, they are also arranged to comprise the general subject of which the technic piece is an example. For instance, while a partial vulcanite plate and repair is being made, the lecturer takes up rubber, vulcanite, vulcanizing, vulcanizer, presses, flasks, packing and finishing, etc.

These technic procedures are designed with the thought of eliminating all superfluous details which do not have a direct relationship to the making of an identical piece for a practical case. Alloys, karats and gauges of materials, styles of teeth and facings required are all indicated, for both technic and practical cases in either the legend of the

teaching model, the laboratory card, the instruction sheet, or all three. For construction of practical cases in the infirmary which are assigned as nearly as possible in progression with the technic work, the student is referred again to his technic sheets and cards, besides the instruction received at the chair by the demonstrator. The variations and additions involved in practical work, as distinguished from technic, are specifically covered in the lectures, during which appropriate portions of the text are assigned for study also. For instance, during the making of dowel and shell crowns, the infirmary procedure of root and stump preparation is given.

In addition to the above details, we are also considering the inclusion with the technic instruction sheet of a list of instruments needed in the procedure and the sequence of their use. It is also intended to apply the laboratory card, with the checking of successive steps, to the practical cases as soon as the details can be worked out, and for each fixed or removable bridge or partial plate to require a study model of the case as well as the working model and another showing the conditions when completed. Not only will this have its value as a record of the student's work, but what is far more important, will furnish a large variety of examples of different design for similar conditions.

Having such a plan as here outlined and adhering to it strictly carries a big advantage to the teaching staff by eliminating conflicting ideas. Any member of the staff who is concerned with teaching prosthetic dentistry can give the student instruction at any stage of the work. He need not fear that the next instructor who comes in contact with the student will reverse his directions. Any differences of opinion are thrashed out with the Head of the Department, who welcomes suggestions for betterment.

The student also profits by this arrangement—he may go on with his work knowing that if one step is approved by an instructor he will not have to tear it all to pieces and begin over again the next day to please another instructor.

The teaching models are the standard for comparison, and of course, changes will have to be made in them from time to time as new methods develop.

One required piece, specified in each session, is made by the student on his own judgment. No instruction sheet nor laboratory card is issued for this, but we encourage the student to consult with us and his fellows as to details. We call this a museum specimen, meaning that it may get into the museum perhaps—if it is extremely good.

For the freshmen and juniors this consists of the same thing for the entire class.

In the senior class we specify several pieces, so that groups of four or five only will be working on the one thing.

The Seniors draw lots for these, relieving us of any charge of favoritism in placing the best selections, and making quite an occasion of gayety.

All technic work is displayed in a large case in a room open to the students at all times. This spurs them to produce work of which they will not be ashamed, knowing that it cannot escape criticism. All technic work is returned to the students at graduation, or upon leaving the school for any cause with the exception of a few museum specimens selected from year to year for their excellence, this of course being an honor much sought.

The graduates find these specimens of much assistance to them in their offices in explaining the nature of various kinds of prosthetic work to patients. The expense of making technic work is more cheerfully borne when the student knows the specimens are to be returned.

In order to make sure that the student at the end of his college course, picks up the loose ends of instruction and acquires a comprehensive grasp of the subject of dental prosthesis, we have instituted the following plan: In the

second semester of the Senior year, a number of subjects are assigned for a thesis in lieu of a final examination. This year we have ten topics which pretty thoroly cover the subject. About ten weeks are allowed for preparation, including the Christmas vacation of three weeks. The theses are all presented on the same day. The best one of each group is selected, the writer is required to read it in class, and several other members of the class appointed to discuss it. Thus every student has to write a thesis, discuss another thesis and listen to the reading and discussion of all the others and his final credit is based on his discussion as well as on his own thesis. Two theses are usually presented at one session of the class, the reading and discussion of these taking from two to four hours. Much interest is aroused, the discussions are highly entertaining and instructive and sometimes amusing and it would be a dull student indeed who did not derive more permanent and lasting benefit from this plan than he possibly could from a written examination. (I will not inject further details here, but will furnish them to any one interested).

Summary.

System is needed in teaching prosthetic dentistry.

The system must be carefully thought out. Superfluous details and obsolete methods must be eliminated.

Select teaching material for its practical value.

Condense it but include enough history and comparison of existing methods to avoid making the student narrow.

Concentrate on teaching one good method for each phase of prosthesis. Duplicates waste time and scatter energy.

Don't ask the student to do something you can't do.

Stop guessing—be sure your technic will produce the result you claim for it.

Co-operation between various schools is lacking.

Co-ordination of curricula is needed to assure the student he is getting good teaching, no matter in what section of the country.

Invoke the aid of research. Make empiricism science.

Utilize didactic teaching, visual instruction, manual training, teaching model, all leading to practical cases.

More knowledge wanted and better distribution of what we have.

THE TEXT-BOOK OF COMPOSITE AUTHORSHIP.

Charles R. Turner, D. D. S., M. D., Philadelphia.

(Read before Section H, Dr. H. L. Wheeler, Chairman.)

FOR reasons which are, I trust, sufficiently obvious, in accepting an invitation of the chairman to prepare a paper upon the topic announced above, I have done so with the intention of treating the subject in a purely academic manner, altho with the frankly avowed purpose of advocating the plan of composite authorship as that best adapted to the production of a text-book on Dental Prosthesis.

In order to contrast the individualistic and composite methods of text-book authorship, it will perhaps benefit us to first examine carefully the question as to just what are the functions of this type of book.

Books used for instruction are roughly divisable into classes somewhat as follows: First: Manuals of instruction which are generally small volumes or handbooks intended for the instruction of their users in some handicraft or other highly skilled work in which what is chiefly desired is the detailed description of some technical procedures condensed into convenient form for ready and frequent use, and contained in a volume suitable for convenient reference. In this there is seldom the necessity for

a discussion of the underlying principles except as may be necessary to an understanding of the text, and the idea is mainly to put the matter into quickly assimilable form.

Second: Somewhat closely allied to this is the compendium or compend as it is usually called, which is in essence a digest of a larger work or works upon the subject, and is designed to put into compact form the essentials of the subject treated. It might be referred to as an abstract of the matter properly contained in a text-book. It may outline principles but space forbids that it go much into illustrative detail; it must give chiefly the meat of the subject.

Thirdly: The text book proper, which according to my conception of its function should be a sufficiently comprehensive treatment to fully instruct the user in all the essential details of the subject. It must be capable of explaining the subject in a simple and readily understood manner; it must fully expound the principles which underly the matter discussed, and must employ sufficient illustrative detail to vivify these principles; it should be capable of reinforcing lectures given upon the subject, and suitable for use in recitative instruction; finally it must be sufficiently complete to serve as an authoritative source of reference tho it need not be an exhaustive treatise upon the subject.

Finally: The work of reference comprises the most thoro and complete storehouse of knowledge which it is possible to get upon a subject, which is obviously for collateral and supplemental use and is no wise suitable or intended for class room instruction.

Thus it will be seen that the text-book occupies the mid-ground between the compend and manual on one side, and the work of reference on the other. But it must functionate to some degree in both capacites beside developing its own individuality which is the most important of all. Its chief function is that of an active teaching instrument and its text must be prepared in accord with sound pedagogical principles. No more difficult task is imposed upon the author of a text book than of imparting this teaching quality. Unless this is present it will be a failure and neither profound learning nor perfection of literary style can compensate for its absence.

Upon the basis of this conception of the function of a text-book it may be asked whether the plan of individual or that of composite authorship is better suited to the production of a work on dental prosthesis. In the preface of the American System of Dentistry, edited by Litch in 1886 is the statement: "No fact is now more fully recognized than that a clear, intelligent and comprehensive knowledge of any subject can best be communicated by one who has a working acquaintance with it or who has made it an object of special research." This means to me to be particularly true today in this time of even greater specialization when it is more difficult for one mind to compass the whole range of knowledge upon almost any subject of human inquiry. Therefore, I suppose that there will be no debate in the mind of any one that the treatment of the separate subjects in a similar work of reference can best be done by those who have an intimate knowledge of its several divisions. Each chapter of this work under discussion is a monograph, and at the time of its publication was a final exhaustive and authoritative treatise upon some portion of the science or art of dentistry. No one mind was capable of writing the whole of this work, nor could do so now for two reasons. It is doubtful if it were mentally possible for one to write with authoritative knowledge of the whole range of dental subjects, and it would be physically impossible because after one phase of the matter had been completed, the state of knowledge upon this portion of the subject would not remain stationary while the remaining portions were being prepared. No such work on a subject so

constantly changing as the practice of dentistry could ever be authoritatively final.

Of course no such comprehensive task is imposed upon the author of a text-book, but he must not lose sight of the fact that there is the same obligation to write with authority, and his conclusions must take into account the then existing state of knowledge upon the subject and they must be final at least so far as the fully established facts are concerned. The text-book author or authors are not only presenting facts, they are also imparting the method of utilizing those facts. In scientific instruction they must expound the principles underlying these facts and their use so that the student who has learned the principle may be able to deduce new facts or understand newly presented ones. In works of a literary or historical character it may be enough for the author to simply assemble the knowledge without necessarily having to demonstrate its interrelationships: in a scientific work it is the principles that are the all important elements. In any field where clinical experience and observation are of importance in determining ability to speak with authority, where the mere study of the recorded observations of others can not enable one to present the matter convincingly, it seems to me that those who have had special experience or have made the field one of special research are the ones best qualified to impart instruction on the subject. I need not remind you of the force of authority which such writing always seems to carry. Those who have had the experience are able to discard the useless: they have tried it out; they recognize the essential; they have learned its value; they have learned the short cuts as they have worked them out. They can apply the pragmatic test.

Apply these several considerations to a text-book on dental prosthesis and without reference to any works now in existence, are we not justified in assuming that merely as a plan, this is more logical than that by which the whole subject is treated by the single author? We are justified in doing so, I think, provided the objections which may be urged against the composite plan are overcome. Generally speaking a book presented as a unit of work from one mind would have an advantage in this unity. It should have a better balance in the proportion of its various elements, it should be a more harmonious whole with no contradiction in text, and subservant in all its parts to carrying out the central idea of the author. I frankly admit that if it could display the final authoritative knowledge of the composite plan, it would be the best conceivable. For a text-book dealing with a subject like general chemistry, or biology, mathematics or physics, some similar concrete science, this method is to be preferred—it is the only one. But for a text-book on surgery, dental prosthesis, or similar science of experiment, it cannot have the same advantage.

The disadvantage of the composite plan must, however, be overcome before it should be accepted as the better, for otherwise it might be simply a collection of improperly related monographs. This can, I think, be accomplished by delegating to the editor prerogatives and privileges not usually in the editorial bailiwick. Ordinarily it may be stated that the function of an editor is to make the writer of the text being edited say what he intended to say, in a manner readily understood. The editor of a text-book must be more than this: he must be general manager as well. He must first lay out the plan of the work, arranging the topics in their original order, and defining the limits and space to be occupied by the work of each author. Either he, preferably, or some one else, should assume the task of presenting the underlying principles of the general topic—in this instance what might be called the "principles underlying dental prosthesis." He must reserve the right to cur-

tail contributions which extend beyond the proper limits assigned to the topic discussed, whether this means cutting down to proper space dimensions or removing portions which overlap some other field. He must harmonize the several sections of the text, not only with the general central plan, but where conflict occurs between the writings of two or more contributors. In short, he must be allowed to bring the whole into a harmonious unit with the same latitude allowed the individual author of a text-book. Practically this is easily arranged if the several authors are informed in advance of the importance of this privilege.

If these plans are carried out in the text-book of composite authorship, it seems to the writer that such a text-book should have all the advantages of both methods and none of the disadvantages of either.

REPORT.

(Dr. H. L. Wheeler, Chairman.)

I have a very short report to make upon the only book of Prosthetic Dentistry that has, so far as I know, appeared during the past year, and that is a new edition of "Dental Prosthesis," by Dr Wilson, in which there have been some changes. There is an increased amount of space devoted to "Anatomical Antagonizers," and a large number of pages have been allotted to Dr. Rupert E. Hall, also to selecting the proper forms of teeth, more space being given to utilization of the idea of the contour of the face as well as that of temperament. This work does not, as you know, take in Crown and Bridgework at all, but for the ground which it covers it is a very complete book, in concise form, and has been well brought up to date.

The other books which we use more than others are the "American Text-Book of Prosthetic Dentistry," edited by Dr. Turner, and the book by Dr. Prothero of Chicago, which I believe has been brought out in its second edition.

Section II held its meeting, which Dr. Hillyer has already spoken of; we got together around the table and had a heart to heart talk and we certainly gained a great deal to our advantage.

THE TEACHING OF ANESTHESIA AND ANESTHETICS.

By Herbert A. Potts, M. D., D. D. S., F. A. C. S., Chicago.

(Read before Section V, Dr. E. H. Long, Chairman.)

IN PRESENTING this paper for your thought and discussion I should like to first draw your attention to the subject in a general way and divide it into two parts, namely:

1. General Anesthetics and Anesthesia.
2. Local Anesthetics and Anesthesia.

In the teaching of anesthesia we must consider that the majority of operations in and about the mouth can be better and more safely done under a local anesthetic than under a general one and that it is logical that we spend more time in an effort to turn out finished local anesthetics, rather than general anesthetists. However, one should not deprecate the importance of a knowledge of general anesthesia, because it is required by State Boards, and second that the dentist, even tho he does not administer a general anesthetic to his patient when

such is needed, should be familiar with the important points of its administration.

In the practice of dentistry, the chief general anesthetic and the one in most common use is nitrous-oxide in combination with oxygen-gas, therefore we should endeavor to specialize, if I may use the terms, in teaching this anesthetic.

A general comprehension of general anesthesia is very desirable, but I question in a measure whether we are properly safeguarding the public in leading the students to believe that after they have graduated from our schools they are competent to induce general anesthesia even tho they have the legal right. The general hospitals of the country have pointed a way, in that the majority of them have their own resident anesthetists. This will be required under the proposed standardization of hospitals which will soon be undertaken.

The medical student, when he has graduated and passed his State Board, is legally qualified to practice medicine and administer general anesthetics. In former years the anesthetics in our general hospitals were administered by the newly graduated internes. It was the lack of uniformity in results obtained at their hands, the unfavorable sequels, and fatalities at times, which led to the employment of trained anesthetists. The dental graduate is in practically the same position, and even tho he has the legal right, I doubt very much if he has the moral right to really learn the art of inducing anesthesia by practicing, untutored upon his own patients. It seems to me that he might better perfect himself in the art of local anesthesia which will be of far more use to him. Then if he desires to enter the broader field and administer general anesthetics he should take a special course under the direct tutelage of a professional anesthetist and there are now numerous courses open for him. If we are to teach the student to give general anesthetics he should be taught by didactic lectures covering the subject as it is presented in various text-books, but of more importance is the actual administration of the anesthetic directly under the supervision of a trained anesthetist. There are many methods given in text-books, but if one is to familiarize the student with the subject in the space of time allotted, the most widely employed, simplest and safest methods must be taught, this I think is the open method, which implies proper thickness of gauze over a simple mask and a continuous dropping of ether. By this method fewer accidents occur, fewer complications arise during administration and fewer post-anesthetic troubles follow.

For the administration of nitrous-oxid oxygen we have many excellent mechanical devices; it requires more skill to maintain a perfect continuous anesthesia by means of these drugs than any other, and repeated administrations directly under the supervision of a professional is necessary for one to master the art.

The chief reason for a wide experience under a professional anesthetist is that practically no two people will take an anesthetic in the same way and in no one case will all possible complications arise, and in order to be master of the situation at all times, it is necessary that one actually witness these various complications, and the oldest in experience has yet some new complication to meet. Consequently in the administration of the few cases which occur during the college course, one will have fallen far short of being familiar with what might be termed normal anesthesia, to say nothing of these cases in which complications arise.

Improvement in technic and popularity of local anesthesia are greatly reducing the number of general anesthetics administered in dental colleges and also in general hospitals. Consequently the

opportunity for the study of general anesthesia has been greatly curtailed.

There is a vast difference between the knowledge required to pass an examination and that required to anesthetize a patient with the minimum amount of danger and discomfort, the latter requireing an adequate experience, plus the same amount of knowledge. I would rather take my chances with a nurse who had been properly coached over a period of months, in giving, we will say, 500 anesthetics, than with an intern who had the didactic training but no experience in the practical application of it.

One must realize that anesthesia is a science which requires special study and that an anesthetist should be a specialist, the highest type of which is one who after years of experience, both in theory and practice, not only of his own specialty, but of kindred subjects, rounds out his own subject with a course of study and practice. And I doubt if one has the right, morally at least, to practice such a specialty without having had adequate preparation.

The comparative safety of gas has led the dentist to use it with impunity. The false assurance has also been engendered by some manufacturers who in exploiting their wares have urged the unskilled to use these rapidly acting drugs as a mechanic would use an engine of power on an inanimate object.

The student should be impressed with the fact that the more rapidly the drug acts the more easily may it get his control also the drugs which depress the vital organs are to be used only when it is impossible to use safer ones. The rule should be—always use the safest drug but in an emergency use the safest at hand.

Some of the conclusions of the most familiar with the action and administration of anesthetics are, viz:

1. Nitrous-oxide and oxygen: Safest but more difficult to administer continuously than the other. Less acidosis or fatty changes follow its use. Opsonic index lowered to a less degree. Difficult or impossible to obtain relaxation. When operating in mouth or face, may be impossible to keep patient under and we must use the next safest. It does not contribute to ventricular fibrillation.

2. Ether:—Causes some destruction of red blood corpuscles. Reduces opsonic index, this remains low for five or six days and is largely responsible for post-operative pneumonia. Causes more fatty changes in parenchymatous organs than nitrous-oxide but less than chloroform. Does not contribute to ventricular fibrillation. Can be given by means of the drop method, vapor forced into pharynx, trachea or by means of an emulsion in olive oil per rectum.

3. Chloroform: Dangerous because it lowers blood pressure, causes dilation of heart and blood vessels. Lessons contractility of muscles. Causes ventricular fibrillation which has probably been the cause of death in nine-tenths of the fatal cases from its use. I might add that Levy has especially pointed out the danger of administration of adrenalin when chloroform has been given as ventricular fibrillation is precipitated by it, suggesting that the struggling stage and consequent muscular contraction squeezes the adrenal secretion into the circulation with resulting heart failure. It causes fatty changes, especially late changes.

With these facts before us it seems that with possibly the exception of nitrous-oxide we should not give our students the false sense of security by inadequately teaching them to administer anesthetics when the number of administrations is so meagre as it is in our schools. The student upon the bench sees the patient brought in, sees the dropping of ether upon the mask, hears a strange sound, and sees the anesthetist carry the patient's jaw forward, he notices the disappearance of the sound, then the operation begins, but little does he know what is passing thru the anesthetist's mind

regarding blood pressure, color, rate and rhythm of pulse, depth and rate of respiration, mucous or blood in throat or trachea, reflexes, depth of anesthesia and many other possible conditions which at any time may mean life or death of the patient.

Furthermore, the student never will learn these things except by "having his own fingers in it," actually by giving many anesthetics under the guidance of one of experience, and this experience only can be had in a special course which he can take until he has mastered it.

With nitrous-oxide it is possible for the student to get a great deal of experience in the art of its administration as there are many extractions to be done in the extracting clinic, but of late the importance of teaching the induction of local anesthesia, which I think is of more real use to the student, has in a measure crowded out the nitrous-oxide.

Time was when "Painless Dentistry" was the stock in trade of the quack but today it can be made to be all that the name implies. I do not advocate or teach that the preparation of cavities should be rendered painless as they can be by infiltration or nerve-blocking but in a few selected cases it may be practical.

With the exception of children the majority of operations within and about the mouth can be better, more conveniently, and more safely done under local than under general anesthesia. If this be true why not spend more time and energy in teaching local anesthesia, as you know it needs a lot of teaching and demonstration and then the student rarely more than half succeeds but he is in a position to study and improve his technic and finally master it.

This can be taught at the chair in the clinic, to the extracting clinic and in the oral surgery. It should include study and recitation from text-books and clinical experiments under a teacher who will take the student thru the various steps of preparation of solutions, and instruments, impress asepsis from start to finish, preparation of field of operation, kind of needle, short bevel toward the bone, injection submucous of subperiostial, nerve blocking or a combination of any or all of them, pressure and waiting a sufficient time before operating, etc., etc.

This should be begun in the Junior year by lectures and recitations, by study and demonstrations upon skulls and wet specimens. It should be shown that the anesthetic must thoroly infiltrate the tissues to be operated upon if infiltration is to be practiced and if nerve blocking is employed the anesthetic must be deposited around a nerve trunk. This implies a knowledge of not only gross anatomy and location of nerve trunks, but minute anatomy, because bony tissue can not be infiltrated except thru the natural minute foraminae thru which course the blood vessels and the counter pressure must be supplied by the periosteum, necessitating the introduction of the needle beneath it and slow steady expulsion from the syringe. All this and much more can be shown on specimens projected by means of the stereopticon or projectoscope, utilizing the cuts from text-books. Clinical demonstrations should be continuous in the extracting room and oral surgery, thru both junior and senior years.

REPORT.

Dr. E. H. Long, Chairman.

I was disappointed in not having a large attendance at the meeting of our Section. However, a paper was prepared by Dr. Herbert A. Potts, of Chicago, on "Anesthetics and the Teaching of Anesthesia," which was read by title, and we ask that it be published in the Proceedings.

REPORTS

REPORT OF THE COMMISSION ON TEXT-BOOKS.

Mr. President and members of the Institute:

This year ten publishers have sent 110 books for our inspection as follows:

Wm. Wood & Co.	26
W. B. Saunders & Co.	20
B. Blakiston's Son & Co.	14
D. Appleton & Co.	14
Lea & Febiger	12
F. A. Davis & Co.	9
Medico Dental Pub. Co.	7
Ritter & Co.	4
Consolidated Dental Mfg. Co.	2
Lee S. Smith & Son Co.	2

Besides these, we received notification from C. V. Mosby Co. that a full line of their publications had been sent but were not received. We desire to express our appreciation of the co-operation of these publishers in our efforts to place the various text-books before you for your inspection. Of these 110 books exhibited, one was in bound form, the size, binding and contents indicated. This volume on "Army Dentistry" by Dr. Keyes, published by D. Appleton & Co., is to be issued in February, 1918, and promises to be a particularly valuable book at this time. Other new volumes are:

1. Head—"Modern Dentistry," W. B. Saunders.
2. Stokes—"Third Great Plague," W. B. Saunders.
3. Radissh—"Manual of Anatomy," W. B. Saunders.
4. Dixon—"Manual of Human Osteology," Wm. Wood.
5. Martinier & Lemerle—"Diseases of the Face and Jaws," Wood.
6. Eycleshymer—"Anatomical Names,"
7. Thoma — "Oral Roentgenology," Ritter & Co.

New editions since our last report:

1. Cunningham—"Manual of Practical Anatomy," Wm. Wood.
2. Kirk—"Physiology."
3. Hutchinson—"Food & Diatetics," 4th edition, Wm. Wood.
4. Dorland—"Medical Dictionary," 9th edition, Wm. Wood.
5. Joy—"Applied Anatomy," 2nd edition, Wm. Wood.
6. Wilson—"Dental Prosthetics," 3rd edition, Lea & Febiger.
7. Broomell—"Anatomy & Histology," 5th edition, Blakiston.
8. Bastedo—"Material Medica," 2nd edition, Saunders.
9. Young—"Hand-book of Anatomy," 4th edition, Davis.
10. Bethea—"Materia Medica & Prescription Writing," Davis.

Through some misunderstanding the several chairman of the sections have failed to review these new books and editions. In order to carry out this effort to have a comprehensive review, we suggest that men be invited to assume the responsibility of the review in assigned departments and thus co-operate with the chairman in the successful accomplishment of his task. There have come to your committee so many requests that books be placed on sale at the meeting of the Institute that we recommend, if agreeable to the publishers, that a sales-agent be provided, who may take orders and, at the same time, keep a personal supervision of the books during the sessions. Also, it seems wise to your committee to request that in the future, a separate room be provided for the book exhibit in order that those interested may be able to quietly inspect the various volumes.

Respectfully submitted,
ELLISON HILLYER, Chairman.

REPORT OF COMMISSION ON NOMENCLATURE.

We beg to present herewith an exhibit of the contract entered into between P. Blakiston's Son & Co., of Philadelphia, and the American Institute of Dental Teachers, for purposes of permanent record:

"P. Blakiston's Son & Co., of Philadelphia, having contracted with Dr. W. B. Dunning of New York, to edit a Dictionary of Dental Terms, with the full consent and approval of the American Institute of Dental Teachers, now agree with said American Institute of Dental Teachers, represented by its Commission on Nomenclature, hereinafter called Commission, in consideration of mutual advantages, as follows:

I. (1) The publisher assumes all expenses attendant upon the manufacture or publishing of said Dictionary, in consideration of which the copyright of all printings and editions, is to belong to the publisher.

(2) The publisher is to print on the title page, the words "Authorized and Approved by the Commission on Nomenclature, American Institute of Dental Teachers" or words of like import.

II. (a) The Commission:
Furnish certain collections of dental terms which have been compiled by it from time to time, free of cost, and will further assist in an official way, the gathering and compiling of a complete list of dental terms.

(b) Reserve the right to approve or disapprove all terms to be incorporated in said Dictionary; only such terms as are approved by it being included therein.

(c) Not be bound to assist. Any assistance offered or given by it, is considered purely voluntary.

(d) The Commission is to review and correct when necessary, all definitions, the same to be submitted by the publisher or editor, monthly. If such definitions are not mailed back in thirty days, then it will be assumed that they are approved.

III. It is understood in the event of war, that these stipulations will be adhered to as nearly as possible by all parties, but the exigencies of State and Service must take precedence.

IN WITNESS WHEREOF the parties have signed this agreement on the 19th day of February, 1917.

P. BLAKISTON'S SON, Publisher.

Witnesses: Allan S. Klein.
George W. Heyood.

For the Institute of Dental Teachers:
John F. Biiddle, President.
Abram Hoffman, Secretary.
Russell W. Bunting)
A. D. Black)Executive Board.
A. W. Thornton)
M. L. Ward)
W. H. Welker)Commission.
F. B. Moorehead)

Several hundred terms have already been compiled and approved by the Commission: The work of the Dictionary is proceeding satisfactorily, and we are hoping that another year may see it well advanced toward completion.

Respectfully submitted,
F. B. MOOREHEAD, Chairman.

REPORT OF MASTER OF EXHIBITS.

Gentlemen:—Keeping in mind the hampered transportation facilities which obtain at the present time, the schools which have made the necessary sacrifice of time and energy to prepare and send exhibits of technic to this meeting are to be especially commended for their spirit of responsiveness and industry.

Seventeen of the forty-six colleges comprising the Institute are represented by more or less comprehensive exhibits. Two other institutions located a considerable distance from Pittsburgh had

large exhibits lost in transit. This was especially unfortunate as in each case a great amount of time and energy had been given to collect and prepare the material for our instruction and entertainment.

Classifying the exhibits on hand we have the following results:

Anatomical	1
Anatomical (Dental)	5
Bacteriological	1
Engineering and Free Hand Drawing	7
Laboratory Note Book	3
Metallurgical	3
Orthodontic	4
Prosthetic	10
Photographic	1
Physiological	1
Radiographic	1
Special Exhibit of Standardized Prosthetic Tools and Instruments	1

The name of each school sending or bringing an exhibit follows:

Atlantic—Southern Dental College.

Marquette University.

University of Michigan.

State University of Iowa.

Thos. W. Evans Museum and Dental Institute—University of Pennsylvania School of Dentistry.

University of Buffalo.

University of Illinois.

Northwestern University.

Indiana Dental College.

College of Dental and Oral Surgery.

Ohio State University.

Royal College of Dental Surgeons.

Western Reserve University.

Philadelphia Dental College.

University of Pittsburgh.

McGill University.

I wish to thank each and every one of the gentlemen who so kindly and courteously contributed toward the making of a display of dental technic and teaching appliances of more than passing interest.

Respectfully submitted,

CLYDE H. HEBBLE,

Master of Exhibits.

CONSTITUTION AND BY-LAWS

AMERICAN INSTITUTE OF DENTAL TEACHERS

FORMERLY INSTITUTE OF DENTAL PEDAGOGICS.

Organized at The World's Columbia Dental Congress, Chicago, 1893.

REVISED CONSTITUTION AND BY-LAWS.

ARTICLE I.

Name and Object.

Section 1. This association shall be known as the "American Institute of Dental Teachers."

Section 2. Its objects shall be the improvement of the educational department of the colleges comprising its membership, by interchange of thought and formulation of methods.

ARTICLE II.

Officers and Standing Committee.

Section 1. The officers shall be a President, Vice-President and Secretary-Treasurer, the same to be selected from the active members and elected by a majority ballot at the annual meeting.

Section 2. There shall be one standing committee of three members, which shall be known as the Executive Board, the same to be elected by a majority ballot at the annual meeting.

Section 3. The Executive Board shall be elected and serve as follows: At each annual meeting there shall be one member elected to serve for three years.

ARTICLE III.

Meetings and Quorum.

Section 1. The regular meeting shall be held at such time and place as may be decided upon by the Executive Board.

Sec. 2. On the written application of the representatives of seven colleges the President may, on thirty days' notice, call special meetings to be held at such places as may be most convenient.

Sec. 3. Representatives from ten colleges shall constitute a quorum.

ARTICLE IV.

Members and Dues.

Section 1. Any college in the United States or Canada which complies fully with all the requirements of the National Association of Dental Faculties as regards educational standards, is eligible to apply for membership in this body.

Sec. 2. Active members shall consist of accredited representatives from the teaching staff of the colleges holding membership.

Sec. 3. Each college holding membership in this body may be represented by one or more of its teaching staff as its representatives, and such representatives shall be entitled to all the privileges of the Institute, **except that no college shall cast more than one vote on any matter acted on by the Institute.**

Sec. 4. Any teacher having been an accredited delegate to this body for three or more years from a school in good standing, may, in the event of withdrawing from the faculty, of such school, be made a permanent member—without vote—by a two-thirds affirmative vote of the members present.

Sec. 5. The annual dues shall be twenty dollars ($20.00) from each college, payable in advance. **The dues of a college must be paid before its representative can take part in the proceedings of the Institute.**

ARTICLE V.

Applications for Membership.

Section 1. Applications for membership shall be presented in writing at any

annual meeting. This shall be referred to the Executive Board.

Sec. 2. A favorable report from the Executive Board followed by a favorable vote of two-thirds of the voting representatives present, is necessary to elect the applicant to membership.

ARTICLE VI.

Funds.

Section 1. All funds shall be applied to necessary expense of the Institute and shall be paid out by the Secretary-Treasurer as ordered or as bills are approved by two members of the Executive Board.

ARTICLE VII.

Alterations and Amendments.

Section 1. Any amendment to the Constitution or By-Laws shall be proposed in writing at a regular meeting. It shall lie over until the next annual meeting and every active member shall be notified of such proposed amendment, when it may be adopted by an affirmative vote of two-thirds of the active members present.

ARTICLE VIII.

Section 1. Roberts' Rules of Order shall be the authority governing this body.

BY-LAWS.

ARTICLE I.

Duties of Officers.

Section 1. The duties of the President and Vice-President shall be such as usually pertain to these offices in similar organizations.

Sec. 2. The duties of the Secretary-Treasurer shall be such as pertain to the office of Secretary and Treasurer in similar organizations.

Sec. 3. The President and Secretary-Treasurer shall render an annual report.

ARTICLE II.

Duties of Executive Board.

Section 1. The Executive Board shall receive and act upon all applications for membership. It shall receive and act upon all bills presented to the Institute. It shall provide a program for each regular meeting, which shall be in the nature of papers, exhibits or reports from members upon the several topics pertaining to Dental Pedagogics.

Sec. 2. It shall attend to all business of the Institute and render an annual report of its transactions, which shall be published.

Sec. 3. It shall select the place for each meeting and provide the necessary arrangements.

ARTICLE III.

Loss of Membership.

Section 1. Any college that is in arrears for two years' dues shall be dropped from the roll.

Sec. 2. Any college dropped from the roll for the cause mentioned in Section 1 of this Article shall be required to pay all dues owing at the time it was dropped before it can be voted on for reinstatement.

ARTICLE IV.

Master of Exhibits.

Section 1. At each annual meeting the executive Board shall appoint a Master of Exhibits to serve until the close of the next meeting. He shall have full charge of the exhibits and shall make a report to the Institute.

Sec. 2. The Master of Exhibits shall have power to appoint such assistants as he may deem necessary.

MEMBERS IN ATTENDANCE.

(Taken from Secretary's Register.)

Northwestern University, Dental School—Dr. Fred Gethro, Dr. Arthur D. Black, Dr. Herbert H. Potts, Dr. Robert E. Blackwell.

College of Dentistry, University of Minnesota—Dr. Alfred Owre.

Vanderbilt University, School of Dentistry—Dr. Henry W. Morgan.

Royal College of Dental Surgeons—Dr. W. E. Willmott, Dr. Irvin H. Ando, Dr. R. D. Thornton, Dr. A. E. Webster.

Western Reserve University, School of Dentistry—Dr. F. C. Waite, Dr. D. E. Sheehan, Dr. F. M. Casto, Dr. J. Herbert Hood, Dr. J. P. Henahan.

Chicago College of Dental Surgery—Dr. Chas. E. Jones, Major W. H. D. Logan, D. R. C., U. S. A.

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2	1894—College of Dentistry, University of Minnesota	Dr. Alfred Owre	Minneapolis
3	1894—Vanderbilt University, School of Dentistry	Dr. Alfred W. Morgan	Nashville
4	1894—Louisville College of Dentistry	Dr. William E. Grant	Louisville
5	1894—Royal College of Dental Surgeons	Dr. A. E. Webster	Toronto
6	1894—Western Reserve University, School of Dentistry	Dr. F. W. Castle	Cleveland
7	1894—Chicago College of Dental Surgery	Dr. Truman W. Brophy	Chicago
8	1894—University of Michigan, College of Dental Surgery	Dr. M. L. Ward	Ann Arbor
9	1894—Ohio College of Dental Surgery	Dr. H. T. Smith	Cincinnati
10	1894—University of California, College of Dentistry	Dr. G. S. Millberry	San Francisco
11	1895—University of Iowa, College of Dentistry	Dr. F. T. Breene	Iowa City
12	1895—Indiana Dental College	Dr. F. R. Henshaw	Indianapolis
13	1895—Kansas City Dental College	Dr. C. C. Allen	Kansas City
14	1895—University of Buffalo, College of Dentistry	Dr. D. H. Squire	Buffalo
15	1895—The Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania	Dr. C. R. Turner	Philadelphia
16	1896—Baltimore College of Dental Surgery	Dr. W. G. Foster	Baltimore
17	1896—Philadelphia Dental College	Dr. S. H. Guilford	Philadelphia
18	1896—Cincinnati College of Dental Surgery	Dr. G. S. Junkerman	Cincinnati
19	1896—St. Louis Dental College	Dr. J. P. Harper	St. Louis
20	1897—Ohio State University, College of Dentistry	Dr. H. M. Semans	Columbus
21	1897—Washington University, Dental Department	Dr. J. H. Kennerly	St. Louis
22	1898—University of Pittsburgh, School of Dentistry	Dr. H. E. Friesell	Pittsburgh
23	1898—New York College of Dentistry	Dr. A. R. Starr	New York City
24	1900—University of Illinois, College of Dentistry	Dr. F. B. Moorehead	Chicago
25	1901—Tulane University, College of Dentistry	Dr. Wallace Wood, Jr.	New Orleans
26	1903—College of Dental and Oral Surgery, New York	Dr. William Carr	New York City
27	1903—Univ. of Southern California, College of Dentistry	Dr. Lewis E. Ford	Los Angeles
28	1903—Howard University, Dental Department	Dr. Edward A. Balloch	Washington, D. C.
29	1903—Colorado College of Dental Surgery	Dr. H. A. Fynn	Denver
30	1903—Tufts College, Dental School	Dr. Wm. Rice	Boston
31	1905—Georgetown University, Dental Department	Dr. Shirley W. Bowles	Washington, D. C.
32	1909—Laval University, Dental Department	Dr. Eudore Dubeau	Montreal
33	1910—Creighton University, College of Dentistry	Dr. A. H. Hipple	Omaha
34	1911—Medical College of Virginia, Dental Department	Dr. J. A. C. Hoggan	Richmond
35	1911—University of Tennessee, College of Dentistry	Dr. J. A. Gardner	Memphis
36	1911—McGill University, Department of Dentistry	Dr. A. W. Thornton	Montreal
37	1911—University of Maryland, Dental Department	Dr. T. O. Heatwole	Baltimore
38	1912—Meharry Dental College	Dr. G. W. Hubbard	Nashville
39	1912—Dalhousie University, Faculty of Dentistry	Dr. Frank Woodbury	Halifax, N. S.
40	1912—Harvard University, Dental School	Dr. Eugene Smith	Boston
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